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1892

THE INTERNATIONAL DENTAL JOURNAL

A MONTHLY PERIODICAL

DEVOTED TO

DENTAL AND ORAL SCIENCE.

EDITED BY

JAMES TRUMAN, D.D.S.,

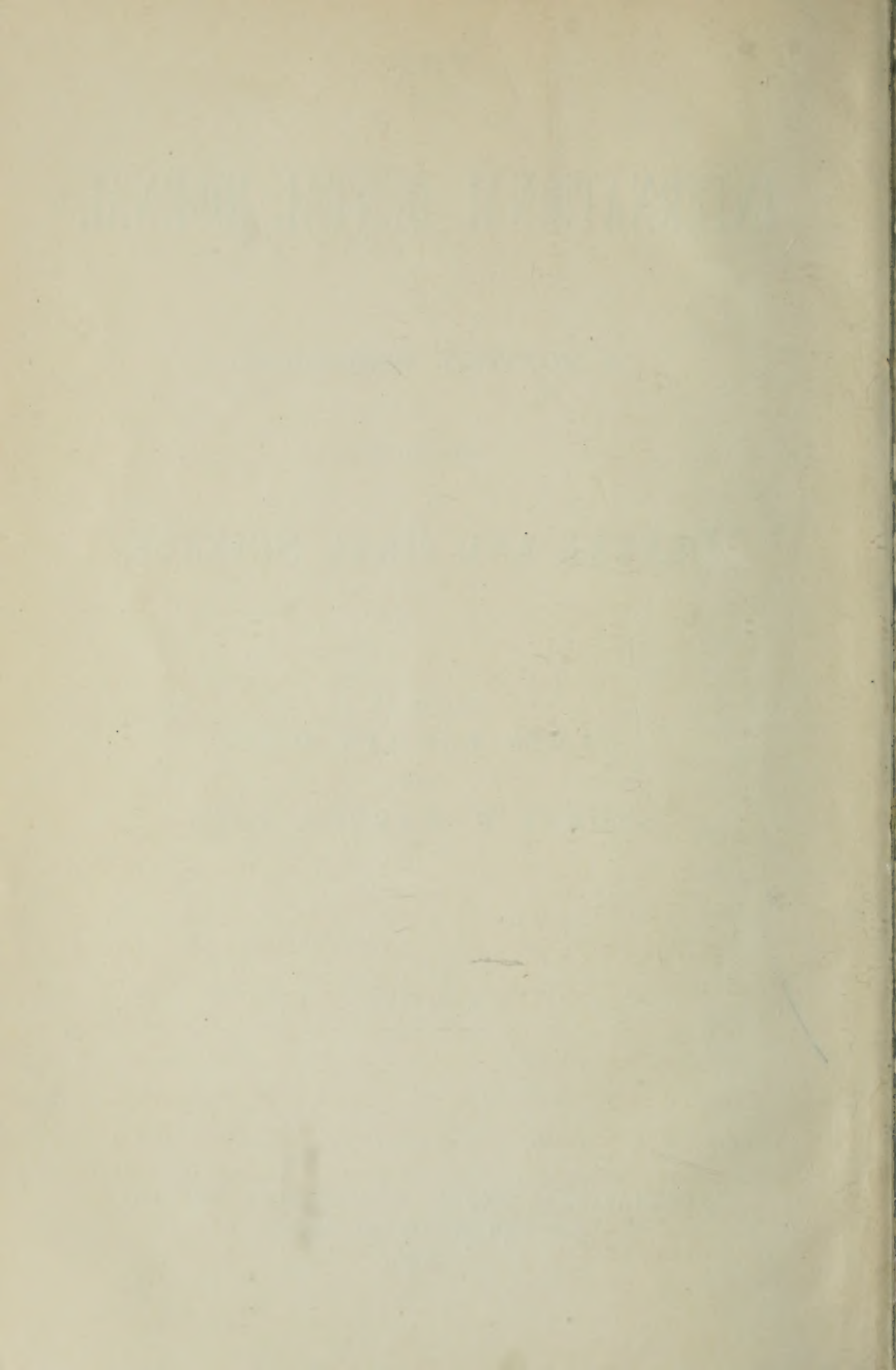
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GEORGE W. WARREN, D.D.S.

VOL. XVI.

INTERNATIONAL DENTAL PUBLICATION COMPANY,
NEW YORK CITY AND PHILADELPHIA.

1895.



LIST OF CONTRIBUTORS TO VOLUME XVI.

- | | |
|--------------------------------|--------------------------------|
| ALLAN, GEO. S., New York. | FILLEBROWN, THOMAS, Bos- |
| ALLEN, HARRISON, Philadel- | ton, Mass. |
| phia. | FOREMAN, J. W., Asheville, |
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Md.

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N. Y.

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N. Y.

WHITE, W. H., Silver City,
N. M.

WOOD, NATHAN E., Boston,
Mass.

WOOLF, ALBERT S., New York.

THE International Dental Journal.

VOL. XVI.

JANUARY, 1895.

No. 1.

Original Communications.¹

HISTORY OF THE DISCOVERY OF MODERN ANÆSTHESIA.²

BY DR. THOMAS FILLEBROWN, BOSTON.

To-day we'll
"Poise the cause of Justice in equal scales,
Whose beam stands sure, whose rightful cause prevails."
And
"If circumstances lead me, I will find
Where Truth is hid, though it were hid indeed
Within the centre."

SHAKESPEARE.

FIFTY years ago to-day there was enacted in the city of Hartford, Connecticut, the first scene in the development of the grandest and most beneficent discovery the world has ever beheld,—the discovery of modern anæsthesia; and this during a half-century which has exceeded all other periods in the magnitude and importance of the discoveries made in science, mechanics, and medicine. We wish to-day to pay our tribute to the memory of the discoverer of this great

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Address delivered at the Memorial Celebration of the Fiftieth Anniversary of the Discovery of Anæsthesia, Philadelphia, December 11, 1894.

fact. To this end let us examine the testimony, restate the facts, and again judge their relative value.

"We can do nothing against the truth." History makes itself; to record it impartially is a difficult task.

Great discoveries and great events do not burst forth with promethean suddenness or completeness, but are the result of long periods of incubation and growth, and oftentimes await many long years of expectancy, hope, and even despair. Such was the case with the great fact of practical anæsthesia. The ancient nations waited for it, hunted for it, but died without the sight. Modern nations continued the longing search, but they caught only a glimpse of the coming day to reward them, until the middle of the present century, when Horace Wells discovered, demonstrated, and proclaimed the great blessing "which stopped pain, robbed the knife of its terrors," and made glad the heart of every sympathizer with suffering.

Insensibility to surgical operations was occasionally induced many centuries ago. Homer mentions the anæsthetic effect of nepenthe, and refers to the inhalation of a vapor of hemp. Dioscorides and Pliny record the use of mandragora. Apuleius, A.D. 125, said, "If a man has to have a limb mutilated, sawed, or burnt, he may take an ounce of mandragora wine, and while he sleeps the member may be cut off without pain or sense." In the third century, Hoa-tho, a Chinese, gave his patients a preparation of hemp, which rendered them insensible to pain. Theodoric, in the thirteenth century, gave directions for preparing the *Spongia somnifera* for inhalations before operations. Ether was known as early as the thirteenth century, and described by Cordus in the sixteenth century, and the name ether was given it by Frobenius in 1730. In 1828, Gerardin read a paper before the Academy of Medicine of Paris describing surgical anæsthesia produced by inhaling gases. In 1800, Sir Humphry Davy made his remarkable statement, that "As nitrous oxide gas appears capable of destroying physical pain, it may probably be used to advantage during surgical operations in which no great effusion of blood takes place." The pity is that this suggestion should have lain buried under the forgetfulness of forty-five years and bear no fruit.

None of the agents used by the ancients proved practical or safe. Consequently, at the beginning of the present century practical anæsthesia remained undiscovered.

Two agents are inseparably connected with the discovery of modern anæsthesia,—protoxide of nitrogen and sulphuric ether.

Protoxide of nitrogen was discovered by Priestley, demonstrated by Davy, and practically applied by Horace Wells in 1844. Sulphuric ether was discovered in the thirteenth century, described in the sixteenth, named in the eighteenth, and practically applied to produce surgical anæsthesia in the nineteenth century. Its use was made known to the world by Morton at the Massachusetts General Hospital in 1846.

Ever since 1818 the physiological action of these drugs has been well understood. In 1849 it was well known that both would produce intoxication, and that both would lessen the severity of pain, having been repeatedly inhaled for amusement and for relief of suffering. So it was but a step from this to the attainment of surgical success, but a step no one had dared take until Wells ventured and bridged the chasm. The history of this step is simple but dramatic. For four years, though probably ignorant of Davy's suggestion, Wells had believed it possible, by the inhalation of certain gases, especially laughing-gas, to produce a degree of intoxication that would obtund the pain of surgical operations. It was also known that Wells possessed the current knowledge concerning the properties and physiological effects of both gas and ether.

At this time G. Q. Colton was delivering throughout the country popular lectures on chemistry, administering at each lecture the laughing-gas for the amusement of the audience. December 10, 1844, he lectured in Hartford, Connecticut. In the audience was Horace Wells, with his mind still occupied with the possibilities of the gas. He inhaled the gas himself; he watched its effects on others. He said to a Mr. Clark, "I believe a man may, by taking that gas, have a tooth extracted or a limb amputated and not feel any pain." Mr. S. A. Cooley inhaled the gas, and while under its influence ran against and overthrew some benches in the hall, thereby producing several severe abrasions upon his knees. When he recovered consciousness he found the skin on his limbs badly bruised and broken, and yet he had not suffered at all, and did not know of the injury he had inflicted upon himself until the spectators had called his attention to it.

Dr. Wells observed this effect of the gas, and at once determined to try it on his own person. A troublesome wisdom-tooth offered the necessary object for the experiment. At Dr. Wells's request, Colton, on the morning of the 11th of December, took a bag of the laughing-gas to Dr. Wells's office in order that he might try the experiment of rendering the extraction of his tooth painless. A number of those present the previous evening, including Colton, Wells,

and Cooley, repaired to Dr. Wells's office. What occurred there is thus described by Dr. Riggs, whose office adjoined that of Dr. Wells, and who was called in to extract the tooth: "Dr. Wells, a few minutes after I went in, and after conversation, took a seat in the operating-chair. I examined the tooth to be extracted with a glass, as I generally do. Wells took the bag of gas from Mr. Colton and sat with it in his lap, and I stood by his side; Wells then breathed the gas until he was much affected by it; his head dropped back; I put my hand to his chin, he opened his mouth, and I extracted the tooth; his mouth remained open some time. I held up the tooth in the instrument that the others might see it, they standing partially back of the screen and looking on. Dr. Wells soon recovered from the influence of the gas so as to know what he was about, discharged the blood from his mouth, swung his hand, and said, 'A new era in tooth-pulling; it did not hurt me at all.' We were all much elated, and conversed about it for an hour after. We were so elated by the success of this experiment that we immediately turned our attention to the extraction of teeth by means of this agent, and continued to devote ourselves to this subject for several weeks almost exclusively."

Dr. Wells continued to use the gas freely in the practice of dentistry during the remainder of that year and the year following, and at all times when he was in the practice of his profession. Then was the deduction and suggestion made by Humphry Davy in 1800 verified by Horace Wells and the prophecy fulfilled, and practical anæsthesia became a discovered and demonstrated reality. "The fierce extremity of suffering was steeped in the waters of forgetfulness, and the deepest furrow in the knotted brow of agony was smoothed forever."¹ This event was the source of the world's knowledge of anæsthesia. All previous efforts had come to naught, but the echoes of Wells's success were soon heard around the world.

In the beginning of the present century science could not interpret the signs, and Davy's conception and prophecy of the possibilities of nitrous oxide fell upon deaf ears, and all the knowledge concerning the power of ether to produce insensibility to pain appealed to sterile minds. And even in 1844 the professional ear was not quite attuned to the sound, and could not recognize in the extraction of Dr. Wells's tooth, on the 11th of December, 1844, the key to the solution of the whole problem of anæsthesia. Even

¹ O. W. Holmes.

those most interested, most acute, and most observant could not in Wells's nearly successful operation before the class of the Harvard Medical School in January, 1845, apprehend the great fact that surgical anæsthesia was a possibility; nor indeed could they perceive it until it was forced upon their attention by the courage of a Morton. If, when Wells extracted the student's tooth, the surgeons of the Massachusetts General Hospital had possessed a little more of that keen perceptive power "of feeling than of seeing, of the heart than of the ear," they would have apprehended the possibilities; and the discovery of surgical anæsthesia would have been then acknowledged and the processes perfected, and no disputing claims would have arisen.

When we realize how hard it is to compel attention to a new idea, how slow is the accumulation of new facts, how gradual the growth of perception, and how great the magnitude of this subject, we cease to wonder at the slowness with which the significance of this event was appreciated.

In future years, whenever and wherever the discovery of anæsthesia is intelligently discussed with knowledge of the subject, the name of Horace Wells will be spoken with honor and gratitude, and with his name will be associated the names of John M. Riggs, G. Q. Colton, E. E. Marcy, W. T. G. Morton, James Y. Simpson, Charles F. Jackson, Oliver Wendell Holmes, and Henry J. Bigelow.

Of these, Dr. Marcy and G. Q. Colton still survive to bear witness to their part in the drama and enjoy their honors. G. Q. Colton administered the nitrous oxide gas to Dr. Wells for the first operation under anæsthesia, and reintroduced its use in 1863. Dr. Riggs performed the first operation, extracting Wells's molar tooth. Dr. Marcy suggested to Dr. Wells the use of ether instead of gas, and verified its action. Dr. Morton made the first public application of ether for surgical anæsthesia. Dr. Jackson claimed to have suggested all that Morton knew about the effects of ether, and the use of it for anæsthetic purposes. Dr. Simpson made himself and British surgery famous by the discovery of the anæsthetic power of chloroform.

Dr. Holmes suggested for this condition of insensibility the name which has become universal. He wrote to Dr. Morton as follows:

"Everybody wants to have a hand in a great invention. All I will do is to give you a hint or two as to names, or the name, to be applied to the state produced, and to the agent.

"The state should, I think, be called anæsthesia. This signifies insensi-

bility, more particularly (as used by Linnæus and Cullen) to objects of touch. The adjective will be anæsthetic. Thus, we might say the 'state of anæsthesia,' or the 'anæsthetic state;' the means employed would be properly called the 'anti-æsthetic agent.' Perhaps it might be allowable to say 'anæsthetic agent;' but this admits of question.

"The words anti-neuric, aneuric, neuro-leptic, neuro-lepsia, seem too anatomical; whereas the change is a physiological one. I throw these out for consideration.

"I would have a name pretty soon, and consult some accomplished scholar, such as President Everett or Dr. Bigelow, Sr., before fixing upon the terms which will be repeated by the tongues of every civilized race of mankind. You could mention these words which I suggest for their consideration; but there may be others more appropriate and agreeable. Yours respectfully,

"O. W. HOLMES."

Dr. Crawford W. Long, of Georgia, used ether for anæsthetic purposes three times during 1842-43, and now appears as a claimant to the discovery. But Dr. Long's connection with the subject was not mentioned until many years after the fact. He did not write a word in regard to his discovery, nor did any notice of it appear in print until 1849,—five years after Wells's discovery, and seven years after he himself had administered the ether.

How could any one, after knowing of such a boon to suffering humanity, resist for even a day the impulse to fly, ". . . on joyful wings cleaving the sky," to proclaim the coming of this great consolation to the afflicted.

Dr. R. M. Hodges wrote of this claim, "Not a physician or surgeon ever used ether because Long had used it; nor did mankind learn from him that anæsthetic inhalation for surgical purposes was possible." His claim was made after the fact, and resting on no better foundation than those claims similarly made by other aspirants for distinction: a class so numerous as to have been named by the London *Lancet* "the class of Jump-up-behinders."

Dr. H. J. Bigelow's connection with the ether discovery was important, perhaps vital to the success of anæsthesia at that time, as in more than one instance he prevented fatal results from over-anæsthesia. Although but twenty-eight years of age, and junior surgeon at the hospital, less than one year in office, he was the one whose penetration, executive ability, sagacious and active qualities of mind and body made him realize that the event of a lifetime was taking place. He made a clinical study of the subject; he made most unremitting exertion to prove the safety of ether; he practically supervised etherization during the first year of its use; he announced to the world the discovery of ether in a paper read at

the Academy of Medicine, November 3, 1846. He verified the anæsthetic power of nitrous oxide in 1848. These facts have identified Dr. Bigelow with the whole subject of anæsthesia; and had he been present at the occasion of Wells's first experiment, it is not unlikely the course of events would have been materially different.

Dr. Edward Warren wrote, "To him next to the discoverer himself are the public and the world indebted for the blessings of so early receiving this great discovery."

The many volumes printed during the exciting years from 1846 to 1863 furnish a great number of statements, opinions, and facts pertaining to this discovery, most of which have ceased to be of any value.

Napoleon is said to have often let his letters lie unopened for several days, giving as a reason that in that time events would answer a greater part of them. So we find that the larger part of the statements, opinions, and arguments in regard to this subject have been answered by subsequent events. Let us contrast a few of the statements made at that time with the facts as now known.

Then some denied that nitrous oxide was an anæsthetic; to-day it is known as one of the most efficient.

In 1844, Wells claimed that the gas was safer than ether; others denied its safety; to-day it stands proven the safest and most pleasant anæsthetic agent known to the world. It was then claimed to be impracticable to use it; now its successful administration annually to more patients than all other agents combined prove its practicability. It was then claimed to be inefficient for prolonged operations; to-day it is proved equal to continuing the anæsthetic state indefinitely. Then it was contended by skilful surgeons and eminent divines "that pain was a natural protection, a necessary stimulant to the reparative process, and a Providential dispensation, and that the prevention of it was defying the Almighty;" now it amounts to inhumanity and malpractice to presume to do any severe operation without it.

Professor Charles D. Meigs, of the Jefferson Medical College of Philadelphia, as late as 1856 wrote of the "doubtful nature of any processes that the physician sets up to contravene the operation of those natural and physiological forces that the Divinity has ordained us to enjoy or suffer," and a clergyman wrote to a medical friend as follows: Anæsthesia is "a decoy of Satan, apparently offering itself to bless women; but in the end it will harden society, and rob God of the deep, earnest cries which arise in time of trouble for help."

The following facts seem to be established by indisputable, sworn testimony, and I believe are admitted by all the friends of truth.

In 1840, Dr. Wells expressed his faith in the anæsthetic power of nitrous oxide. December 11, 1844, Wells inhaled nitrous oxide and had a tooth extracted painlessly, which event immediately became known throughout the city of Hartford and vicinity. Forthwith Wells made a pilgrimage to Boston to proclaim and demonstrate his discovery; he called on Morton, and made known to him this event. Through Morton's intercession an invitation was given Dr. Wells by Dr. J. C. Warren to speak to the class of the Harvard Medical School and describe his discovery. A little later he gave the nitrous oxide to a patient and extracted a tooth for him before the same class with incomplete success. The patient cried out as with pain, but when again conscious declared he had not been hurt.

A month later Dr. Marcy suggested to Wells the use of sulphuric ether for this same purpose, and verified its effects by anæsthetizing a patient with this agent, and removing a good-sized tumor from his head without causing pain. They both discarded ether, as its odor was unpleasant and because they considered it less safe than laughing-gas.

Early in 1845, Dr. Wells administered sulphuric ether to a patient (Gaylord Wells) and extracted a tooth painlessly. In 1841, Dr. Morton was a pupil of Dr. Wells, and in 1842 they were in business together for a time in Boston. In July, 1845, Morton called on Wells in Hartford and talked with him and Dr. Riggs about the gas, and asked them for a supply. Dr. Wells referred him to Dr. Jackson for information as to the manufacture of it. Drs. Wells, Riggs, and others continued the use of gas until November 6, 1846, when chloroform and ether were substituted, and gas remained unused until 1863.

The use of nitrous oxide for anæsthetic purposes was recorded in the *Boston Medical and Surgical Journal* of June 18, 1845, as follows: "The nitrous oxide gas has been used in quite a number of cases by our [Hartford] dentists during the extraction of teeth, and has been proved by its excitement perfectly to destroy pain."

Dr. William T. G. Morton performed his first successful operation with ether September 30, 1846, and on October 16 following he administered ether to a patient at the Massachusetts General Hospital, and on the 17th to the second case. About October 20, 1846, Dr. Jackson claimed compensation from Morton for professional advice, and charged five hundred dollars. October 27, 1846, Drs. Morton and Jackson made oath to a joint discovery of a

compound for the prevention of pain during surgical operations, and applied for a patent. The patent was granted, and in 1863 was declared void, as such a discovery was not patentable. November 9, 1846, Dr. Morton declared it was simply sulphuric ether, not a compound as claimed in his application for a patent. In the autumn of 1847, Drs. Jackson and Morton each claimed to be the sole independent discoverer of anæsthesia, and in no wise indebted to the other, and so contended to the end. In 1847 the Paris Academy of Medicine, upon *ex parte* evidence, declared Morton and Jackson the discoverers of anæsthesia.

In January, 1848, the Parisian Medical Society, after a full hearing of evidence from both parties, voted that "To Horace Wells, of Hartford, Connecticut, United States of America, is due all the honors of having discovered and successfully applied the uses of vapors or gases whereby surgical operations could be performed without pain," and elected him an honorary member of the society.

In 1846 the surgeon of the Massachusetts General Hospital gave Morton the credit of being the discoverer of modern anæsthesia. In 1853, five years after Wells's death, Dr. C. H. Haywood, one of the surgeons present at the first operation, gave the following unqualified credit to Wells for his share in it. He closes a letter to Hon. Truman Smith with these words: "It was no Minerva born with one blow. Moreover, in analyzing the nature of the discovery, we can detect several elements which were successfully brought to light. Thus, we observe in the first period an indefinite search after some method of producing insensibility to pain. Then came a second period where great advance was made, beyond all dispute due to Horace Wells.

"This was the first important step in the history of anæsthesia. The question of priority may be easily settled. It is satisfactorily proved that Dr. Wells's experiments had established the above-mentioned points as early as 1844, though they had not determined either the best agent, or perfected the method of administration in detail. In the third period the anæsthetic properties of certain substances were discovered. First nitrous oxide gas was tried, then sulphuric ether, then chloroform, then chloric ether. These discoveries were all made by different individuals. Now, for which of these agents and to which discoverer shall remuneration be granted? To each and for all I say, to Morton for sulphuric ether, to Dr. Simpson for chloroform, to Dr. J. C. Warren for chloric ether; but before all, let full and ample justice be done to that noble genius which first conceived the grand idea which has

been the basis of all the experiments and father of all the discoveries. To the spirit of Dr. Horace Wells belongs the honor of having given to suffering humanity the greatest boon it ever received from science."

"Thus do facts maintain the majesty of truth." Argument would only weaken the evident conclusion.

Considering Wells was timid, retiring, and only twenty-seven years old when these events occurred, who can wonder that he should return from Boston disheartened; and later, when still suffering from disappointment and the ill effects of his own sacrificing experiments, meet a sad and tragic end. It is remarkable, too, that his rival claimants should both meet an almost equally tragic fate, Morton dying of apoplexy while out riding, and Jackson spending the last seven years of his life in an asylum for the insane. Thus did "the shears of Fate cut the tent-ropes of their lives."

Upon the memory of Horace Wells there remains no blot or stain; against him no charge of selfishness, dishonesty, deceit, or unfairness was ever made. He lived and died honored and respected by the people among whom he dwelt. We best quote the words of one who knew him intimately:

"He had a mind of uncommon restlessness, activity, and intelligence. He early manifested great inventive genius and mechanical talent. He was of medium height, with a head of remarkable size, complexion light, compactly built, of pleasing countenance and address, and of fine personal appearance. As a citizen he was a man of great purity of character and of generous impulses, honoring religion by his walk and conversation; as a son, he was kind and dutiful; and in his family relations an example of kindness and affection. In all these respects he was without spot."

Such a character as this sought only the legitimate emoluments of his calling and was always ready to benefit his profession and mankind. No sacrifice was too great for him to make. Very appreciative of words of encouragement, he was also very sensitive to criticism; hence it is not strange that such a spirit, so young, should quail before the derision of professors and jeers of students. Honest himself, he could not think others dishonest; just, he could not brook injustice. Being denied what he knew were his just claims, his soul was cut to the quick, and a dark veil was drawn over what promised a brilliant and useful life. We lay our wreath upon his tomb; would that we to-day might with it crown his head. Coming generations will recognize in him the martyr and the

world's benefactor, and on every monument which in the future may be raised to commemorate this great event will be inscribed, —To the Discoverer of Anæsthesia,—Horace Wells.

THE RELATIVE PENETRATING POWER OF COAGULANTS.¹

BY JAMES TRUMAN, PHILADELPHIA.

THE question of the proper material for filling root-canals has been a subject of discussion and experiment for the past half-century, or since Maynard introduced the method of filling these canals with gold. In connection with this the consideration of certain agents has led to a decided antagonism in regard to the diffusibility, coagulation, and antiseptic properties and values to be placed upon these in the general treatment of the central pulp-canal and the tubuli branching from this throughout the dentine.

It has been clearly evident that the inner tubular portion, fibres of Tomes and Neumann sheaths, form no insignificant part of the organic matter of the tooth substance, and that death of the central organ means necessarily the death of the whole and subsequent decomposition of this tissue, or at least the central protoplasmic portion, the sheaths being almost indestructible. Hence the treatment of the pulp-canal, however perfectly accomplished, must fail to reach the microscopic elements in the tubes, and the decomposition taking place therein results in the discoloration of the entire tooth, and may act disastrously by septic emanations upon the vitality of the entire structure. The importance of this has not been lost sight of by intelligent operators, but the difficulties of manipulation have been serious. It has been plain that but two methods could be relied upon to overcome the difficulty, the property of coagulation and the diffusibility of various essential oils, aided by osmotic action. Both methods have had decided advocacy and it is very probable that both have a positive value, the extent of which has as yet to be determined, for, as far as I am aware, the relative values of the systems of treatment have not been settled with satisfactory experimentation, or, if so, have not been divulged in the papers upon this subject; all the points defended

¹ Read before the Academy of Stomatology, Philadelphia, December 10, 1894.

by the writers seem almost entirely to be based on assumptions, imperfect experiments, or upon clinical observations.

The difficulties surrounding the subject, and the many errors of observation to which experimentation in this direction is liable, has led to criticism, and have thrown a shadow of doubt upon those made by several observers.

It is not the purpose of this article to enter into any contention with the two schools of thought on this subject, but rather to show, if it be possible, that the arguments maintained with so much vigor and pertinacity that coagulation furnishes its own barrier to diffusion is an error of observation. Further, it is desired to demonstrate that the various coagulants have relative degrees of value. This has seemed to possess some degree of importance in other directions than that of coagulation of albuminoid material in dentine.

The knowledge on this subject seems, as far as I am aware, somewhat crude. The general idea being to rest satisfied with the fact whether a certain agent will coagulate or not, and in many instances writers have ascribed this property to agents that do not possess it. There seems, therefore, good reason for an attempt to settle several questions by careful experiment.

For a clear understanding of this subject a brief *résumé* of the opinions of various writers may not be out of place as a preface to the present paper.

Dr. G. V. Black, who has rendered valuable service in his report on the value of essential oils, makes this assertion in the discussion following a paper by Dr. A. W. Harlan on "The Action of Diffusible Medicinal Agents on Living Teeth" (*Dental Review*, June, 1891). "If it is a microbe that attacks the sarcous elements of the body, the contents of the dental tubules are attacked just as well. So here we need a disinfectant. What shall we use? *Certainly not one of the coagulants, certainly not one that places a barrier to its own penetration by coagulating the albumen, as does carbolic acid, bichloride of mercury, and some others.* These are not the antiseptics you should use in this place, but something that is diffusible, that does not coagulate albumen, something we can depend upon to penetrate in the presence of albumen, and we find that to-day in the use of the essential oils."

In the report on *Materia Medica and Therapeutics*, by Dr. Harlan (American Dental Association, 1889), he makes the following statement: "It is not denied here that coagulants are useful medicaments in dental practice, but we maintain that in the treatment of

pulpless teeth for purposes of disinfection, they are not only useless but detrimental, in fact, their use defeats the object sought to be attained. *They coagulate the organic surface with which they come in contact and prevent their own diffusion.*"

Again, in the paper before alluded to (*Dental Review*, June, 1891), he states that, "The coagulating agents simply coagulate and leave the coagulum to become a source of food-supply to the aerobic and anaerobic microbes. . . . In all my experiments on teeth out of the mouth, the coagulators, in not a single instance, passed through the dentine; as soon as the concretion of the surface of the cavity was affected their action was stopped." After describing the method to prove diffusibility, he says, "In this manner I have found that all volatile oils and turpentine will pass through dentine and cementum, but carbolic acid, creosote, chloride of zinc, and aromatic sulphuric acid will not pass through the dentine or cementum."

Dr. Hugenschmidt, in his paper on "The Conservative Treatment of the Dental Pulp," endorses this idea, for he states that, "When we apply a coagulating antiseptic, we, of course, set up a barrier to the further action of the remedy, as has been *repeatedly and correctly stated by our confrère, Dr. Harlan.*"

For the present it is proposed to leave these various opinions as they stand, though I shall have occasion to refer to them in the course of the paper.

In a discussion on root-filling before the American Dental Association, held at Saratoga Springs, 1889 (*Transactions*), I made the following remarks: "The question that has given me much thought for the past two or three years is that no filling of canals can be perfect. Why? Because a large part of the tooth is made up of tubulated structure, the tubuli holding organic matter, and when the pulp dies the organic substance dies and decomposition begins immediately, and the sulphuretted hydrogen occasioned by **that** decomposition is the principal source of trouble. What should be done? My study of the subject and the results of many experiments led me to the conclusion that it was essential to prevent this decomposition, and that this could be best accomplished by coagulating the organic tissue. The coagulant best adapted for this purpose is chloride of zinc, because of its great affinity for water. It will follow moisture to the very extremities of the tubulated structure, and consequently change the character of the contents so that decomposition will not take place. I have kept coagulated albumen for months without change."

This quotation comprises the substance of my views held five years ago. On the principal points the same ideas are held to-day.

Dr. Edward C. Kirk, in a paper "On Coagulants in the Treatment of the Pulp-Chamber and Canals" (*Dental Cosmos*, March, 1894), takes the positive ground in favor of the use of coagulants, using the following language: "The use of coagulants, such as carbolic acid, zinc chloride, sublimate, etc., has not only overwhelming clinical evidence in its favor . . . but it is actually proper on theoretical grounds, and fully in harmony with the laws of osmosis." His experiments were so carefully made that they seemed, to candid minds, to have settled the question, and yet they have not proved convincing to the opposite side of the question, for reasons not as yet clearly defined or at least not understood.

The direction of this present paper is only incidentally aimed as answer to the assertion that coagulants act as a bar to their own diffusion, for it has to do principally with the proposition, To what extent can this coagulation be relied upon to effect satisfactory results?

The position taken by myself in 1889, that coagulants placed in the central canal would permeate the tubuli and coagulate the contents, remains true to-day, as the experiments in capillary tubes will demonstrate, and as was previously also demonstrated by Dr. Kirk, reported in the *Dental Cosmos*. It is, therefore, useless to combat the ideas entertained in the quotations of an opposing character, as they have no force. The question might be left where it was placed by those experiments, but it seemed to me there was something more to be said on this question not entered into by Dr. Kirk. Some of these points were taken up seven years ago by myself, but dropped for a more favorable opportunity to continue them.

My intention was to endeavor to show that coagulants would penetrate tubes of minutest character possible to be handled satisfactorily, and that this penetration was independent of circulation. My earlier investigations seemed to warrant this belief. Diffusion is recognized in the living tooth as performing an important and continuous part in its nutrition. It seemed certain, as the tubulated portion of the dentine invariably imbibed finely-divided colored matter in solution, that therefore it must take up any other fluid, if of equal solubility, with the same facility. This beyond question is true. The main difficulty here being to demonstrate that the coagulation was continuous without the aid of circulation.

The early experiments abundantly proved this to be true, but they were carried on, at the time, with difficulty.

The effort was, as before stated, to find results in tubes not exceeding a millimetre in diameter, and if coagulation occurred it must be through absolute contact of the agent with the albumen or gelatin used in the experiment. It was necessary to fill the minute tubes with the albumen and then seal the ends. Both processes were accomplished readily by nearly filling the tubes and then quickly melting the ends in a Bunsen burner. This proved entirely satisfactory. It was found, however, that the albumen in the tubes dried and contracted upon itself, leaving spaces. To meet this difficulty the albumen was combined with twenty per cent. of glycerin. This served an excellent purpose, and proved no interference with coagulation either in large or small tubes, with all the agents known to be positive coagulants, with one exception. It was found that mercuric chloride had little or no effect apparently on albumen and glycerin. This was repeated a number of times. It was then applied to albumen without glycerin, and coagulation was immediate. It was found, however, that glycerin simply delayed coagulation, for in the course of a few days the effect of the mercuric chloride was plainly visible in flocculent masses.

This fact necessitated a repetition of all the experiments to determine their correctness. It was found that mercuric chloride was the principal one of the series seriously antagonized by the glycerin.

These experiments have occupied several months, as the conclusions were not arrived at until constant repetitions, under varying conditions, had demonstrated their correctness.

The tubes were drawn to varying lengths not exceeding, as a rule, over 0.5 millimetre in diameter. The unit of time was fixed at ten days. The first series exhibited some variation in the number of centimetres, but as the measurements of the fluids had not been exact, it was determined to try the most important coagulants a number of times with greater accuracy. This gave more satisfactory results, showing in Plate No. 2 very little variation in duplicate, while in Plate No. 1, there is a difference of fully a centimetre in some of the tubes.

The experiments were also made to include the essential oils and many agents known to be non-coagulants, for the reason that some writers have asserted that several of these produced coagulum.

Further, the action on gelatin was examined into, but this was confined to but few tubes and without marked result.

A portion of this work is given in the following table, representing as it does some of the most important coagulants in use:

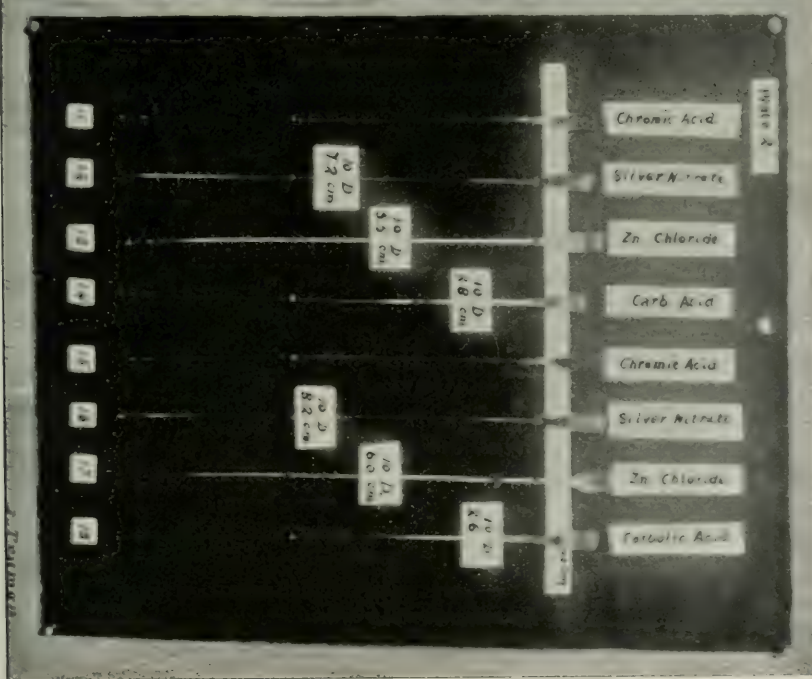
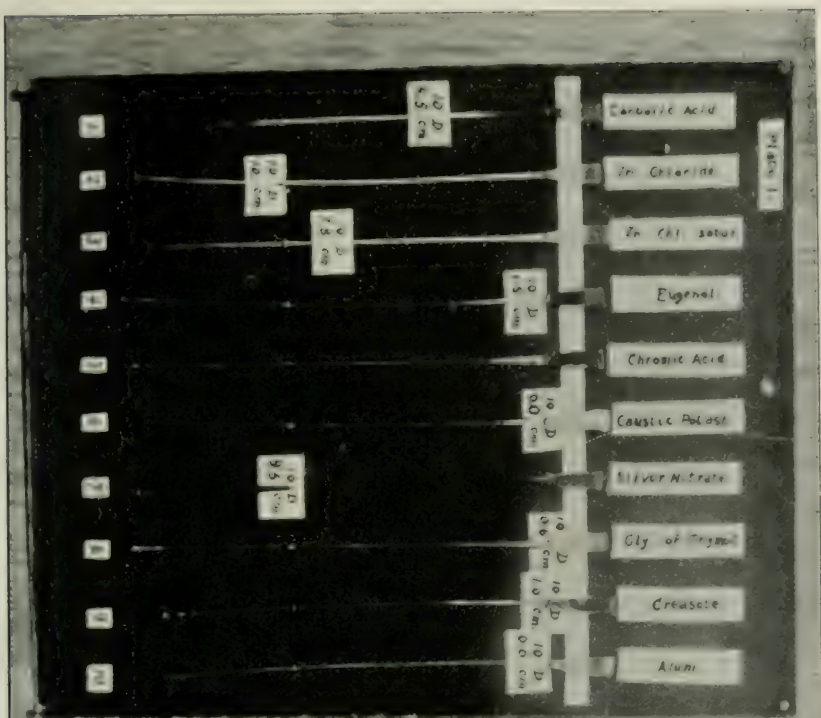
PLATE 1.

Number.	Size of Tube.	Material.	Strength of Solution.	Days.	Length of tube coagulated.	Coagulation.	Color.	Material used.
1	mm. 0.5	Carbolic acid	Full strength	10	cm. 4.5	Perfect	White	Albumen and 20 per cent. glycerin.
2	0.5	Zn. chloride	Oxychlor. sol.	10	10.	"	"	" "
3	0.5	" "	Sat. solution	10	7.8	"	"	" "
4	0.5	Eugenol	Full strength	10	1.5	Imperfect	"	" "
5	0.6	Chromic acid	Sat. solution	10	...	"	Brown	" "
6	0.5	Caustic potash	" "	10	...	None	"	" "
7	0.5	Sil. nitrate	" "	10	9.5	Good	Black	" "
8	0.75	Gly. of thymol	" "	10	0.6	Fair	White	" "
9	0.75	Creosote	" "	10	1.	Good	Orange	" "
10	0.75	Alum	" "	10	" "

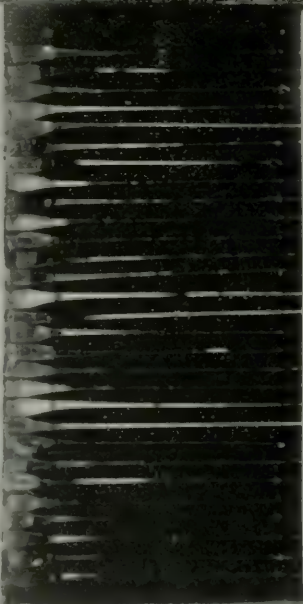
PLATE 2.

Number.	Size of Tube.	Material.	Strength of Solution.	Days.	Length of tube coagulated.	Coagulation.	Color.	Material used.
11	mm. 0.75	Chromic acid	Sat. solution	10	cm. ...	Imperfect	Brown	Albumen and 20 per cent. glycerin.
12	0.75	Sil. nitrate	" "	10	7.2	Very good	Dark	" "
13	0.75	Zn. chloride	" "	10	5.5	Good	White	" "
14	0.75	Carbolic acid	" "	10	2.8	"	"	" "
15	0.75	Chromic acid	" "	10	...	Imperfect	Brown	" "
16	0.75	Sil. nitrate.	" "	10	8.2	Good	White to black	" "
17	0.75	Zn. chloride	" "	10	6.	"	White	" "
18	0.75	Carbolic acid	" "	10	2.6	"	"	" "

When the results of these experiments are analyzed, it is found, taking Plate 2 as the best representation, that no results were attainable with chromic acid. This was tried repeatedly in the small tubes, 5, Plate 1, and 11, Plate 2, also in 4, Plate 3 (large tubes). Silver nitrate exhibited thorough coagulation, 7, 12, 16, Plates 1 and 2, and tube 1, Plate 3. With zinc chloride the coagulation is complete in 2, 3, 13, 17, Plates 1 and 2, and 28 and 46, Plate 3, and tube 2, Plate 4, and also in the large test-tube. Carbolic acid shows partial coagulation in all the small tubes, but complete in No. 3, Plate 4. This last tube, however, was not started properly, owing to difference in density of the two liquids causing



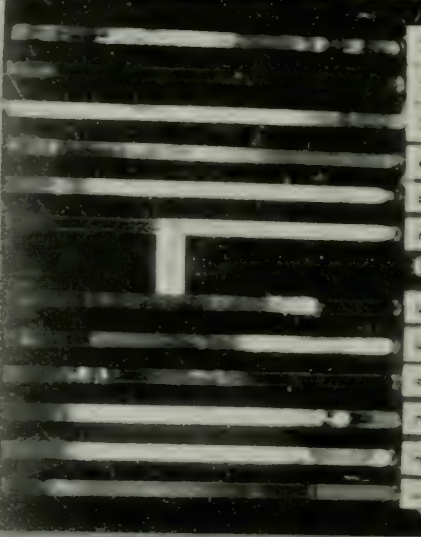
20. Creosol
21. Oil Claves
22. Camphor
23. Oil Santal
24. Oil Santal
25. Tannic Acid
26. Oil Clove
27. Oil Clove
28. Oil Clove
29. Oil Clove
30. Oil Clove
31. Castor Oil
32. Oil Mercury
33. Oil Zinc
34. Camphor
35. Oil Santal
36. Oil Santal
37. Oil Santal
38. Oil Santal
39. Oil Santal
40. Oil Santal
41. Castor Oil
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Tubes. 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50. have gelatine in them. 37 to 47 inclusive have been treated with the albumen. All the others have been treated with the albumen.

1. Silver Nitrate.
2. Chl. Zinc.
3. Carbolic Acid.
4. Chromic Acid.
5. Chl. of Tin.
6. Creosote.
7. Chl. Mercury.
8. Chl. Mercury.
9. Camphor.
10. Oxychloride of Zinc.
11. Camphor.
12. Camphor.



Test tube showing the action of Zinc Chloride on a mixture of Albumen and Gelatine, in the proportion of 1 to 1.

The description on the test-tube should read, *Albumen and gelatine*, and not *Albumen and Gelatine*. Wherever the dead white appears in small and large tubes, it indicates the extent of conglutination, with the exception of tubes containing silver nitrate; in these the conglutination is invariably dark colored. No. 10 of the larger series represents the conglutination by oxychloride of zinc, the upper portion, to the break in the continuity, being that material, and the lower portion conglutination. Those tubes not clearly defined in the illustrations are those in which there was only partial or entire absence of conglutination.

them to mix to some extent. The variation in centimetres in ten days, Plate 2, is very slight, the lengths being in No. 14, 2.8 centimetres, and in 18, 2.6 centimetres.

Whenever possible the effort was made to have coagulation proceed in opposition to gravity. This is beautifully shown in the test-tube.

What does the work as a whole teach? 1. That coagulants do not prevent by their own action the diffusion throughout the entire tube.

2. That the penetrating power of such agents as creosote, carbolic acid, and zinc chloride, those most frequently used, varies materially. That creosote is a very poor coagulant when compared with carbolic acid, and the latter, for this purpose, is not to be compared with zinc chloride or silver nitrate.

3. That in proportion to the coagulating power of the agent will be its penetrating force independent of gravitation.

No attempt was made to determine with exactness the penetrating property of essential oils, but if coloration is any indication, the tubes presented do not indicate that this is of much value in closed tubes, but this, it is acknowledged, may not apply in tubes where circulation is an adjunct to aid penetration.

In order to test various agents, such as the essential oils, and also to repeat the tests with agents already used, as carbolic acid, chloride of zinc, creosote, etc., with albumen and glycerin, and without glycerin, and also the effect on gelatin, the series of tubes ranging from 20 to 50 were prepared.

It will be observed that creolin gives but slight coagulating effect, oil of cloves about the same, carvacrol shows slight cloudiness, sanitas oil slight coagulation, mercuric chloride no coagulation in this tube (glycerin and albumen). Tannic acid shows extended coagulation; oil of cinnamon, action marked but limited; oil of cajaput, no result; caustic potash, no result in this or other tubes; zinc chloride in gelatin, no result; phenol sodique, partial coagulation. On No. 36 an attempt was made to carry staining with the coagulation. Zinc chloride was colored with carmine, with the result that the coagulation left the stain and proceeded down the tube. Eugenol is but a poor coagulator, shown in 41*a*. On thymol, the effect is but slight and not continuous.

Tube 10, Plate 4, is given to show the possible action of oxychloride of zinc on the contents of the tubuli in the dentine. The oxychloride, of the same consistency used in filling pulp-canals, was placed in the funnel portion of the small tube. It soon hardened, but

the coagulating process was marked upon the albumen. It began immediately and has continued without interruption to the present time. The line of demarcation between the oxychloride and the coagulation is distinctly shown. This, probably, is one of the most satisfactory of the tests, as it abundantly proves that contact with albumen is all that is necessary to produce coagulation with zinc chloride, and if this be possible out of the mouth, how much greater must it be under more favorable conditions in the tooth.

Caustic potash was experimented upon not as a coagulant, but to observe the effect on albumen and gelatin. Though several tests were made, no visible results were produced, though this does not antagonize the recognized quality of this agent as one of the most deeply penetrating and uncontrollable caustics used on the tissues.

The action of nitrate of silver in repeated tests was rather a surprise. It has generally been regarded as a superficial coagulant, but in every instance it has proved deeply penetrating, and coagulating with rapidity and certainty, very nearly equal to zinc chloride. This fact assumes some importance in connection with the use of this agent in teeth. Its rapid penetration raises the question, Can we use it without danger to the pulp in posterior teeth as has been recommended? At present I am not prepared to answer this question, but it seems as though a risk equal to that assumed in the use of zinc chloride is taken when placed in children's teeth for the prevention of caries.

The experiments were extended to the penetration of the tooth structure by a number of coagulating agents. A large number of teeth were kept under the action of these, the pulp-canals being first slightly enlarged and filled with the agent daily. The result has not been entirely satisfactory, microscopic examination shows decided action throughout the dentine, the tubes, in several sections being nearly obliterated and indicated only by fine lines; but while this demonstrates a positive change in the organic contents of the tubes, it does not absolutely show that this has been caused by the coagulant. Thus far I have been unable to carry the stain given the agent along with the coagulation. Silver nitrate in several sections penetrated in seven days two-thirds the length of the tubes, but the extreme discoloration made it impossible to follow the individual tubes except at the extreme limit of coloration. Tests were made with a variety of stains, but with no result, the coagulation invariably separating from the stain. When the color can be carried along with the coagulation, it will visually show what may

be regarded as absolutely true, that the coagulant is carried in the dentinal tubes as effectually as in those exhibited.

In the specimens prepared for the microscope, the evidence is positive to the trained eye that every tube is filled with coagulated organic matter, and this has been so frequently repeated, and with precisely the same results, that I have no hesitation in accepting it as a fact. I failed, however, to observe any change in the cementum, and I am, therefore, led to doubt the possibility of any coagulating effect in that tissue by any of the agents used.

An attempt was made to verify Dr. Kirk's experiment of cementing a tube in a tooth, sealing the foramen, and then filling the tube with an active coagulant, as zinc chloride. Six perfectly fresh teeth were taken, tubes cemented, and foramen closed. The tubes were of varying length, the fluid in them ranging from a column of 7 to 18 centimetres. These were placed in a second tube filled with egg albumen. The result in four was that coagulation began after several hours at points indicating leakage. One of these was removed, the leak covered with paraffin, and reinserted. This has remained embedded in the albumen for over a month without any result. In two cases the leak evidently was not through defective manipulation, but appeared to be from an invisible crack in the enamel and at the bifurcation of molar roots. The two specimens exhibited will, I think, demonstrate the conclusions arrived at by microscopic tests, that zinc chloride, the agent used, cannot penetrate through the cemental tissue. If this cannot be done by the force of the column of fluid, it certainly cannot by diffusion.

The error, it seems to me, of Dr. Kirk's experiment, lies in the fact that allowance was not made for leakage. It is well known to all histological workers that teeth may be more or less penetrated by cracks. These furnish a clear passage for any fluid forced into the tooth. Fresh teeth are not so liable to this defect, demonstrated by the specimens exhibited.

In the paragraph quoted from a portion of my remarks in 1889, I stated my faith in coagulation as a remedy for discoloration and an effectual barrier to the ingress of micro-organisms into the dentinal tubes. I am still of the same opinion, the only modification I would make of these views then expressed would be that I fear the possibility of the action of the zinc chloride upon the pericementum through its penetrating power, passing out through the foramina, if more than one exists. My observations, as heretofore stated, do not show that the use is at all dangerous if care be taken to close the upper third of the canals thoroughly before placing

the coagulant in the tooth. Clinically, I have observed in one case only an action upon the pericementum, which I have been led to attribute to the zinc chloride passing through the foramen. The large clinical experience in filling root-canals with oxychloride of zinc, now covering many years and a large number of practitioners, seems to show that it can be used without risk, provided proper precautions be taken.

In the use of zinc chloride as an obtundent of sensitive dentine there cannot be two opinions. The experiments demonstrate, beyond cavil, that this agent is exceedingly dangerous to the life of the pulp, and should be abandoned for that purpose.

While it is recognized that the experiments are by no means exhaustive, I regard them as demonstrating the incorrectness of the views quoted, and must further regard them as placing the question on an intelligent basis, and perhaps adding something to our knowledge as to the relative penetrating power of coagulants.

I am indebted largely to Mr. F. McS. Thomas for valuable aid in the manipulative part of the work, which has necessarily been of a tedious character.

AN ADDRESS UPON THE FIFTIETH MEMORIAL CELEBRATION OF THE DISCOVERY OF ANÆSTHESIA.¹

BY DR. JAMES E. GARRETSON, PHILADELPHIA.²

I AM to assure this great audience that I stand in its presence overwhelmed by the contrast which separates subject and speaker, and that I find words in deference only to the circumstances of the occasion that brings us together.

It is no profane comparison to suggest that naught but a sense of profanation could associate with a priest who should add words to the lifting of the Host. Does not a priest, in performance of this act, set a seal upon his lips? Does he not wrap in vestment which has been blessed the hands that are to touch the sacred symbol? The profundity of the meaning, not to say the holiness, of what seems to me to be among the greatest of God's gifts to man, anæsthesia, affects me in its contemplation, as I assume the priest

¹ Delivered at Philadelphia, December 11, 1894.

² Senior Surgeon of the Medico-Chirurgical Hospital, etc.

to be affected as he approaches the Host. The full feeling is,—be still.

Silence! and its golden meaning!

Surely,—forcing ourselves to talking and listening,—the gold of anæsthesia is silence. Silence in place of agonizing, heart-rending screams. Silence in place of cries from the lips of pitying, but helpless, by-standers. Silence in presence of torture shorn of its terror.

On an occasion, now many years back, I was wandering through the lanes and alleys of Sleepy Hollow Cemetery, in the town of Concord, Massachusetts, when, being led up a hill, I stepped over a low, much-abused hedge of arbor-vitæ, discovering a plain, low-set stone, having upon its face a single word. When at the foot of the hill, I had found myself surrounded by what would not inaptly bear description as splendid mausolea. Upon these marbles were deeply cut many names, and the records of many virtues. Neither names nor virtues had, however, significance to me. No chord was struck, no response elicited.

The word upon the low-set stone of the hill-top was Hawthorne.

The ring of a bell is its metal. The name of a man is his work. Men who have done something, either as cause or instrument. What reverberations ring out as such names are encountered! Somewhere, everywhere, is a sound. The lives of great men, the memories of the lives of great men,—left to remind us.

Horace Wells! The name does not, nor will not, still. It rings, and rings, and rings, in distinctness, albeit accordant and discordant sounds are everywhere around it.

The task of reviewing the history of anæsthesia was given to the worthy colleague who has preceded me. I am glad of it. Standing, as I feel myself to-day, overshadowed by names and memories,—memories of blighted lives, of mental wreckage, of discouragements ending in suicides,—what, but admiration of the sacrifices made; what, but desire to do homage; what else than these should or could fill a human heart on such an occasion? Here Cæsar can be praised, and Rome too.

A new good is an old gift,—not new in ages past only because channel was lacking. Electricity before chaos. An Edison the production of a nineteenth century. Euphrates, Tigris,—both water Mesopotamia; both, alike, are the Persian Gulf. Not Armenia is the source. A common under-spring is the well constituting the divine afflatus.

My perceptions view Horace Wells as Euphrates and Tigris

are viewed ; he, and these, and all as phenomena ; not as things in themselves, but as things in other things. Whether or not this man was a meditative philosopher to be found oftenest in haunts apart from men, or whether or not he was simply a vessel capable of holding, but never trying to fill itself, I am alike without knowledge, as without desire to know. He was filled, however. The river of Lethe found in him a channel. Everywhere over the land flows the stream Nepenthe.

To change a metaphor. Is invention aught but filling a form ? Is this not a matter made plain by Plato two thousand years back ? Are not forms eternal ?—forms of things seen yesterday, to-day, and to be seen forever ? forms not yet seen ? Is invention else than seeing a form and bringing it down from the sky to the uses of men ? Materializing it, properly speaking. How as I grow old do I grow impressed with this : the maker of forms the all, the filler of forms, simple instrument.

It is not even slight departure from the immediate subject of the occasion to make further reference to this matter of forms, for it is not otherwise, according to my conception, that Horace Wells is to be either understood, appreciated, or called the discoverer of anæsthesia.

Was it, truthfully, Priestley to whom nitrous oxide owes its discovery ? It assuredly was not to Horace Wells. Was or was not anything known of this gas before the day of our own Declaration of Independence ? Or is it rather to be put thus : nitrous oxide is phenomenon deductively exposing itself to the chemist out of the droppings of camels upon desert sands ; Ammon and ammonia go back to Libya.

No one has been, or is, greater than Plato. What the dung-burners did, or what Priestley has done, is not credited by him as science, but simply as dealings had with phenomena. "Science," he says, "fritters itself, where its aim is otherwise than knowledge of noumenon." Things unlike are not necessarily dissimilar. The things that lie within things are multitudinous. Who knows even yet what nitrous oxide is ? Who knows even what water is ? In a word, who knows what or how much anything is ? Nobody.

But the scientist is the evolutionist. Possessing himself of means, he analyzes. Analysis is one, or closely one, with deduction. Science has no thought, or word, or action, outside of matter.

But forms, the true objects of science, as affirmed by Plato, constitute the invisible. The music of a musician is not his notes, the poet's inspirations are not grammar. Reality, or at least nearer

approach to reality, is back of these. Notes are to be seen by anybody having eyes, and words are to be heard by anybody having ears. But what as to forms, or ghosts, as these are back of notes and words? What as to the seers of these? No forms being back of notes and words, there are no notes and words in front of forms.

Was not the ghost of anæsthesia with the camel droppings? Was it not with the dudaim, the devil's apple, of the Arab? Has it not been with alcohol since men distilled and knew this agent? Is it not with the poppy through all the ages that fields have been made red by this plant?

In 1540 the oleum vitrioli dulce was first given to the uses of men by Valerius Cordus. He had not the name ether for it, but his oil was akin with the ether of Frobensius, and with the ether of to-day. Guthrie, Liebig, and Soubeiran simultaneously discovered chloroform in 1831. Did Cordus, in 1540, see or tell anything about a ghost of anæsthesia, as this lay in his sweet oil of vitriol? With chloroform filling the bottles of druggists, in 1831, was anybody to be found who had been introduced through its use to the wonderland of Euthanasia.

Let here the idea be repeated of nobody knowing what anything is. Cadmus, beyond all men of his times, saw letters. A Shakespeare, beyond all men of his times, saw use lying with letters. How many are the expressions lying with letters not yet seen by anybody? Forecast the unwritten poetry.

Here is culmination; and here is the place of Horace Wells in history. Horace Wells saw in a room at Hartford what had never before been seen by mortal man. He saw anæsthesia. It was ages before he was born that ether was materialized, and it was before he was born that nitrous oxide was formulated, and it was when he was in no way thinking about such things that chloroform was brought forth. The seer saw anæsthesia. The sight lay, as I understand, with a hurt hand of which no complaint was made. Others, many others, saw the blooded hand. In a distant State, about the same time, I myself saw the hurt hand, but none, not one of the many others, saw anæsthesia. I think it is not to be denied that some saw a filmy halo that meant anæsthesia. There was a something, but what the something was they did not make out. What was seen was seen only to be forgotten. Truly, Sir Humphry Davy is to be credited with a sight and feeling of an elysium. Ego was differentiated for him by nitrous oxide from environment; but, while he felt and saw, it was separability that was felt and seen, not anæsthesia. His expression on coming from

under the influence of nitrous oxide is familiar, "Nothing exists but thought."

Anæsthesia, the thing being truly understood, is barrier between matter which does not feel, and Ego, which is percipient. It is not matter that sees, hears, feels, touches, or tastes. Does the matter temporarily composing the cadaver of a dissecting-room see, hear, feel, touch, or taste? Percipient is away from it; there is neither seeing, hearing, feeling, touching, nor tasting by a cadaver; a flute separated from its player is wood, having no sing in it.

I am not to credit Horace Wells with sight of separability. The "Me, and the not Me," is not likely to have been seen even by his internal eye. His seership lay with a direction that people delight to call practical. Of many things, hundreds, thousands, perhaps, lying with nitrous oxide, he saw one. But what a one! Here begins his glory. Here is to continue his glory. Here, so long as pain is esteemed hurtful and absence of it pleasurable, will the name of Horace Wells be upon the lips of men.

Parallels recall obligations and glory due others. Apples have fallen since first apples began to grow and ripen. Kettles, in which water was being boiled for the evening repast, have opened their iron lips and tried for numberless centuries to say what they had to tell about locomotion. Over the earth and across the face of the heavens electricity has sought vainly until lately for a seer. The sun with his rays full of perfect pictures, brought as free gifts to men, could find no taker.

In the year 1665 a seer sitting under a tree at Woolsthorpe found himself able to hear fairly well what a falling apple had to tell about the moon staying where it belongs. Heron of Alexandria, holding his egoistic ear to the spout of a kettle, heard a story of steam and wrote it down in the shape of his æolipile. Papin saw the cylinder. Fulton saw a steamboat. Stevenson was, perhaps, the first witness of a train of cars drawn by a locomotive. Thales of Miletus got a story of electricity from a piece of amber. Daguerre, not, however, until the age of the world A.D. 1839, was able to take what the sun had to give of sun-pictures. Mozart, beginning with the use of common sense, and from this passing to the advantages lying with educated sense, dropped at the last both these and put down in form of notes what alone the flowers whispered to him,—having found out that education is not always the best teller of things that are to be heard.

Not unnecessarily to detain, was anæsthesia, as anæsthesia, known to surgery before 1844 as it became known in that year and

since remains known? Not nitrous oxide, not ether, not chloroform, not rapid breathing, but anæsthesia.

Who was the man of that year? Horace Wells. Does this not settle the question?

Let, however, all deserved honor and glory associate with names of workers and experimentalists as these have enlarged application of the inspiration of the Hartford seer. Ether, chloroform, what would surgery do without them? How could the world do without them? How *did* the world do without them?

It is not necessary in this presence to enlarge beyond a sentence on the benefits of anæsthesia to humanity. Are not all here assembled doing and experiencing, each after the manner of his work, what I did and experienced only yesterday. Upon the operating-table of a hospital lay sleeping sweetly and quietly as ever baby slept a member of our fraternity. In place of an ordinary neck was a tumor that reached from chin to sternum and from ear to ear. Wherever, as it proved, reaching fingers could reach, prolongations of this mass extended themselves. Salivary glands, trachea, carotid arteries, jugular veins, pneumogastric nerves, all were more or less embraced and wrapped about; yet, while so horrible a dissection as was required to remove the mass went on, sleeping and dreaming quietly continued, nor was any consciousness had by our brother of his terrible experience until an hour later he awakened snugly tucked away in one of the most comfortable of beds, the tender hand of a godly nurse wiping away the cold sweat-drops standing threateningly upon his forehead.

Consider, in contrast, a picture familiar before the day of Wells's inspiration! A mother, her heart welling out in tears, limbs trembling so as scarcely to afford her support, helpless misery characterizing her countenance, despair striking at her with its thongs of flame, follows into a hospital operating-amphitheatre a nurse who carries her first-born, which is being brought to the table. Alas! helpless, indeed, is the mother. How more than gladly, how a thousand times more than gladly, would she lay down in place of the child! Cries of mother and child moan through the hospital, and the least sensitive feels his cheek pale. The crucial moment has come; the child is placed and held by force upon the table. The mother is torn away. For a single moment eyes of mother and child have met in parting. A loud, frightened, despairing cry from the child rings from ceiling to floor of the room. The mother drops in a heap and is carried out a raving lunatic; she raves about and curses God as being without pity or mercy.

Let a concluding picture, having relation with the first, help cover the intermediate one,—an intermediate one which extended, alas! from the days of the first surgical performance to the year of grace eighteen hundred and forty-four.

A mother brings to a hospital a child whose deformity requires the knife for its correction. Conscious of the power of anæsthesia, the surgeon talks to the parent, while all the while the little patient, pleased and inveigled by the sweet smell of chloroform, is itself anæsthetizing itself. The cutting is done. The child had a dream of roses and gardens and wide fields. The mother has placed in her arms her restored offspring. She has no tears, no words; her contact has been alone with beneficence. She is overwhelmed by the mystery she has met and passed. She says, "Our Father which art in heaven." She says and feels there is a God of pity and mercy.

Look at the name of the maker of these pictures of the new time; it reads, Horace Wells.

To what extent anæsthesia has cultivated sensibility I leave every surgeon to judge. Who, if suddenly transplanted into the olden times, being possessed of his present knowledge of anæsthetics, could handle a knife without cutting everywhere else than where it would be desirable to cut; otherwise dying shortly, out of sympathy for his patients? Could he say, "Merciful Father which art in heaven," in place of thinking, "Pitiless devil who is in hell"? Alas! how near to hopeless atheism may ignorance bring a man. Hail! that knowledge shows God and Father everywhere. Hail to all poets, to the music hearers, to the seers of forms of every kind! Let statues be stood for them in the squares. Let tablets of enduring brass mark their working-places. Let us place and hold them with the immortals.

Hail to him who has proven to be, perhaps, the greatest of the seers,—Horace Wells!

THE PHYSIOLOGY OF HYPNOTISM.¹

BY ALFRED H. PORTER, D.D.S., PHILADELPHIA.

(Continued from Vol. XV., page 690.)

To summarize the foregoing, actual perception demands a phase of energy embracing both peripheral nervous elements of the retina of the eye and central nervous elements of the brain. Mental endeavor, although often concomitant with peripheral energies, demands the interdisposition of central energies alone, especially when it combines different phases to form new ideas. Having described simple perception as consisting of an undulating form of energy corresponding to that of the ethereal agitation in the environment and memory (which is the fundamental faculty of mind, for without it there would be nothing to deliberate, judge, or reason about) as the retention of this energy, we now proceed to the discussion of co-ordinated perception and consciousness and the arrest of the unison of energies effecting this by the hypnotic stimulus. In normal life these are ever varying with the continually changing environment. In the hypnotic condition a continuous strain exists, owing to the unceasing impact of waves on the retina representing the object regarded. This never-relaxing subtle but powerful stimulus antagonizing the anabolism of the tissues is eminently traumatic, acting as an insidious concussion no less potent because unseen, effecting the same results as visible impetus or pressure, and in the same way. Yet we must not forget that concussion, physical or mechanical, is but an exaggeration of normal sensation, that every sensation is an exciting stimulus whether the result of ethereal agitation of light and heat waves, affecting the retina and cuticle, aerial, acting on the tympanum, or of material pressure, visibly contactual with the sensory apparatus. These act precisely as the hypnotic stimulus, except that their effect is gradual on the higher centres of consciousness, and produce normal sleep after long-continued action. In their varied character allowing the recuperation, practically, the intermittent momentary sleep, of the tissues, lies the essential difference between them and the constant hypnotic stimulus. Normally, a katabolic disintegrating action continually goes on, restored to anabolic, high phases of energy by the metabolism of oxidation.

¹ An essay read before the Alumni Society of the Department of Dentistry, University of Pennsylvania.

If this affected all the cells of the retina at the same time, as it does in our hypnotic cases, no continuous consciousness could exist. In this fact lies the gist of the argument.

With an ever-varying environment at its maximum, as when a beautiful scene combines unity of design with diversity and graduation of hue and area, any individual cell subject to the wave-action corresponding to this will gradually exhibit less vibrant energies, until the oscillation is so low as to make use of the heat energies of the carbon and oxygen, and then rise again to its full period of vibration. The cell in the centre of the trough of the wave being subject to no exciting stimuli, will be recuperating, while that on the summit of the wave will be manifesting the high phases necessary to carry on the work of perception. As the wave proceeds to the brain, every cell in its course will exhibit a constantly-varying phase of energy, all manifesting the same phases, but at different times.

Every cell in the retina, according to the duration and size of the exciting environing wave, will exhibit alternately this downward, traumatic, excretory, dissociating wave, and a rising, associating, vitalizing positive wave. Virtually the rods dipping into pigment draw on metabolic resources to weigh as in a fine balance the various incoming waves. The fact that one cell can be among the low heat energies recuperating chemically and physically, while another is exhibiting high phases, secures the continuity of perception.

The clue to this possibility of the energies of the cell is that the environment is graduated and so excites lower differential phases until the lowest metabolic phase is reached, then it excites higher phases until the highest anabolic phase is reached. This only happens in a perfectly normal state, the energies of the cell being enabled to respond to this form of excitement by the maintenance of an equilibrium. This scheme secures two important things. In order to perceive a fine line or delicate shade in the landscape, a definite tension of the cell is needed, and is effected by a chemical association responding to the specific wave. But with an ever-changing environment such an association may not be needed for more than a second. It is eliminated by the downward negative wave. A new wave continually stimulates, requiring a new association, and this is effected by the upward positive wave. The rising positive waves not only must respond to a definite color and size, but several cells conjointly must excite a large cell in the molecular layer with which they are connected by nerves. The

reason of this is that in the environment we find an intricate design composed of simple parts. The rods and cones respond to the different parts, and conjointly form a wave to represent the complex design. The large cells receive this compound wave, and so represent the contour or complex object perceived, for this combining power is their special function. On a larger scale the ganglia of the brain, gray cells, and pigment layers are foci of differentiated waves of energy, representing what has been seen, heard, and felt, coursing as electrical currents along the nerves, and held static by the magnetism of the cells, thus effecting co-ordinated apprehension, judgment, and reason. In this case the energies of the large cell or ganglion may not represent a composite design directly perceived in the landscape, but the conception of an artist or inventor. He may deem the design the creation of his imaginative genius and entirely original. It may be so in the light that his was the first brain in which the combination occurred, the first brain with the spider cell corresponding to the idea. But the elements of any intellectual or emotional association, whether that be picture, invention, poem, or simple plan of daily work, are represented by the energies of single cells, developed from the neuroglia of the brain in response to external excitation primarily. Our very consciousness of our surroundings, which departs at the end of the day's activities, is dependent on energy of large ganglia contributed by single cells throughout the night.

The rising constructive wave furnished by these is of special interest. For while in the visual centre a branched cell is an anatomical representation of the main branches of an external truncated object, the compound wave formed of myriads of smaller ones is the physiological representation of our conception of the outer world of hue and configuration in all its detail,—it is the electrical vibratory picture before referred to. The single cell acts as a di-electric; it is kept in a state of tension by the equipoise of opposite electricities, enabling it to respond to a stimulus, and excite contiguous nerves just to the extent of that stimulus for co-ordinating purposes. But if the tissue through malnutrition or irritation is not strong enough to bear the strain of this equipoise and separate the electricities for the directive purpose described, the union of these will cause a current to circulate through the cell. Any stimulus of whatever phase, however slight, will impress itself on the energies disproportionately, and the full current will exhibit this phase.

No combining power is possessed now by the various cells, but

all clearness of outline and definiteness of configuration is lost in the general exaltation. A confused figure will apparently be seen in the landscape, suffused with light, a normal optical illusion.

We have been describing the effect of the ever-varying normal environment, and found in it destructive and constructive elements. We can picture the effect of a constant hypnotic stimulus, allowing of no rising constructive waves, but creating extreme tension by an all-prevailing negative wave keeping down a strong positive wave. According to the strength of the cell enabling it to stand this strain of opposed electricities will a discharge take place.

If the stimulus be not too severe, and the tissues normal, this will be discharged by the metabolic agencies, and normal sleep will ensue. Otherwise an explosion will occur traumatically, a current will circulate through the cell and involve the retina and the whole nervous system. This hyperæsthetic condition is the essential characteristic of hypnosis, differentiating it from ordinary sleep, rendering suggestion and control possible from external sources. If the term "hypnosis" means wakeful, somnambulistic sleep, the condition under consideration is rightly designated. But it means the reverse. It designates the anæsthetic condition of the nerves when the current, after circulating with increasing vehemence, and exhibiting the traumatic negative phase, is discharged by metabolic exchange. In this condition the cell will not even respond to the irritating, irregular action of tense waves denoting pain, for it is depleted of its idiostatic responsive forms of energy. This paralyzed condition is the effect of physical and chemical narcotic alike, after intense stimulation.

The characteristic of the normal cell as we described it is that its energies rise and fall, and exhibit exactly the same amount of energy as the exciting source, and thus maintain an equipoise of energies and a constant temperature.

The abnormal cell exhibits energies out of proportion to the exciting source, instead of retaining its energy and using it to restrain contiguous energy (the *raison d'être* of deliberation and self-control), it gives up its energies to form a current to circulate through the brain, inhibiting consciousness and all the faculties of the mind.

The very energy that accelerates the unrestrained passions is formed of the energy which normally governs them.

The circulating energies explain the phenomena of the exalted memory, and delusions characteristic of hypnotic states. Not only will a slight noise be magnified and seem deafening, or a point

of light seem to swell in size, but the central energies of the brain itself furnish phases according to the ideas they represent. The free current energy will be impressed with that of whatever cell it comes into contact with, directed by the simple suggestion of the operator through the medium of the word centre.

This is the hyperæsthetic and hyperactive condition of all forms of amentia, whether the exciting source be the atomic energies of chemical hypnotics, malnutrition, overwork, or the hypnotic stimulus of a wave of light. That dominance of general, central activities allowing the accomplishment of regulated, governed, co-ordinated actions and thoughts, is replaced by the dominance of current activities surging through the nervous elements, the lower forms of mental activity prevail, delirium and resurrection of the past experience of life, auræ, convulsions, and unrestrained exhibitions of conduct generally.

(To be continued.)

A METHOD OF FILLING ROOT-CANALS.¹

BY DR. JAMES H. DALY, BOSTON.

THE few thoughts I have to present to you this evening were suggested, first, by a case of necrosis caused by the slovenly application of arsenic; second, by an article in the *Dental Cosmos* of last year, by Nelson S. Shields, stating that gold-foil was the only material for a root-filling.

The application of an arsenous acid dressing that a pulp may be destroyed is an all-important feature in the final result as to whether the filling of a root-canal is to be successful or not.

If the merest particle of the acid is allowed to escape from the cavity and come in contact with gum-tissue, then commences a destruction of it which is minor in importance to what follows.—destruction of the septum of bone between the teeth. An inflammation is here established in the pericementum that is often thought to be caused by the pulp, and unnecessarily long and protracted treatment of the pulp-canal is the result. It is of the utmost importance that no part of the arsenical dressing come in contact with the tissue surrounding the tooth. A very severe case

¹ Read before the American Academy of Dental Science, June 6, 1894.

of necrosis came under my observation, caused by an unnecessarily large amount of acid being placed in the cavity in the first place, allowed to remain for a very long time, and the dressing so placed that there was a constant escape from the cavity of a small amount of the arsenous acid. The result was that a large area of bone was destroyed, necessitating removal.

In destroying the dental pulp, a positive method, and one not followed by unpleasant features, is to administer gas and forcibly remove the pulp with a barbed broach. That patients are not always willing to have this done we are all aware.

In filling root-canals, I assume that we agree that the important feature is to thoroughly seal the apex of the root, not to force material through, neither to allow a small space to remain unfilled. A few operators, and I speak advisedly when I say a few, *can fill* tortuous canals, and have them hermetically sealed with gold-foil; but the majority are unable to successfully do so, nor is it necessary to thus exhaust both patient and operator. For that reason, I find that a gold wire tapered at the end may be made to perfectly fill the end of the canal.

With suitable-sized gold wire for the case at hand, taper the wire and sharpen the extreme point, that it may easily be forced through the end of the canal,—not sufficiently to seriously wound the tissues, but just enough to prick a little, the patient surely letting us know when that point is reached. Now mark on the gold-wire broach the exact length of the canal, together with the portion of the wire through the end, and remove and file off the tiny sharpened portion; again insert in the canal and force to the end of the root, to see that there is no pain upon reinsertion; again remove and file into and almost through the wire one-sixteenth of an inch from the end; then again insert, and, having forced to the end of the canal, twist the gold broach slightly, leaving the small portion that was nearly filed off at the end of the root, thus securely sealing it with a “royal” metal.

The remainder of the canal may be filled with any of the root materials,—gutta-percha, oxychloride, or zinc phosphate, as the operator prefers. It is true that it requires patience and care-taking to successfully cope with some of the flat canals found in superior bicuspids, also in mesial roots of lower molars, or large open foramina in the teeth of children; but if a royal metal is desired, it has seemed to me that this was an expeditious and comparatively easy way to obtain it.

Reports of Society Meetings.

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE American Academy of Dental Science met with Drs. Andrews and Cutler at the Colonial Club, Quincy Street, Cambridge Massachusetts, on Wednesday evening, June 6, at 7.45 o'clock. The paper for the evening was read by Dr. James M. Daly, Professor of Operative Dentistry at the Boston Dental College. Subject, "A Method of Filling Root-Canals."

(For Dr. Daly's paper, see page 31.)

President Smith.—Gentlemen, this paper of Professor Daly is before you for discussion.

DISCUSSION.

Dr. Daly.—Now that I am one of the Fellows I may be free to speak. I expected that some one would say that this is an old method, and a very old method. I knew it, but I wished to present it in the way of contrast to the method advocated by Dr. Shields. Perhaps I might speak of that more at length. His method of filling the root-canal was to ream out with the Donaldson nerve-canal cleanser, using some of the finest broaches with the little barbed end cut off. He says that he can thoroughly and perfectly fill every root, no matter how tortuous the canal may be, with gold.

Dr. Williams.—As Dr. Daly says, his is an old idea. For many years after I became tired of filling root-canals with solid gold, I used to make for myself small conical rods of zinc, of tin, and of lead for filling the roots; but these, of course, can now be obtained at the dental-supply stores. The S. S. White Dental Manufacturing Company has the tin and lead in little boxes. But I did not rely simply on the metal, I placed them in an antiseptic solution or paste before passing them up into the root, and then cut off the metal rod. As far as the "royal" metal is concerned, I should not consider it in any way superior to any other. Whatever does the most good in the therapeutical or surgical treatment of the case is the most "royal." There are some advantages over gold in using the tin or lead. They both have more conservative qualities than gold; but whatever is used, my practice has been to have it well coated with some antiseptic paste, then cutting it off, to leave a short end

in the chamber of the pulp, and seal up the rest with whatever you choose, gutta-percha or any cement, but I prefer gutta-percha as a general thing. Sometimes I fill in around the rod with a paste of cement mixed with an antiseptic solution. This is particularly good for old roots, as it makes them more durable. You can leave the end of the rod long enough, so that in case of future inflammation, requiring vent of the root, you simply have to unstop the cavity and pull out the rod. No matter how sore the tooth may have been, you at once get relief and the tooth begins to mend. I was present at a meeting somewhere at which one man said that the only way to do was to fill roots so soundly with some solid material that they never would inflame afterwards. Now, that is going beyond all principles of surgery; you cannot tell what constitutional effect may come into the stump of that dead root. In talking with an old man who has lost a limb, he will tell you that for many years after it was amputated, when it was cold and damp, he would be troubled with neuralgia in that stump. So at the end of an amputated pulp, where the dead matter leaves off and the living tissues begin, there is an old scar. That may be healed up and may continue strong as long as the person is in good health, but there is still a slight weakness there from the fact that the part has not its full vitality. I have often seen cases where a person would become debilitated from some cause, or be suffering from some special depression, where an inflammation would set in and cause as much pain and trouble as if the pulp had only recently died. In such cases you could not find any reason for thinking that the root had not been antiseptically treated and filled. It is better to have a stopping which can be readily removed to give relief in case of inflammation, and not be obliged to drill and jar the inflamed tooth to remove a solid filling.

Dr. Potter.—To divert a little from the subject but at the same time to follow out a line suggested by the essayist, I would like to bring up the matter of arsenical preparations for discussion. It seems impossible to get a preparation of arsenic that will be absolutely painless; but is there any preparation which is more comfortable than another? I have had offered me by an agent an English preparation which was said to be painless. Of course I would not think of using it, because of its secret character, but if there are any preparations of arsenic whose composition is known which are fairly comfortable, I should like to know about them.

We often hear about "dead teeth." I am very much opposed to the use of the term "dead tooth," unless the tooth is really dead.

The term is unscientific in the majority of cases and sounds badly to a patient. If a person thinks he has a dead tooth in his mouth, he is apt to look upon it with abhorrence and doubt its usefulness. If we call such teeth "pulpless" no such unfavorable impression is given, and we are far more accurate in our statement.

Dr. Daly.—I trust I did not use the "dead tooth" term. I am also very much opposed to it.

In regard to arsenical preparations, there are a number of combinations which are said to be painless, but the one with which I have had the most success is one which Dr. Harlan, of Chicago, recommends. It is a mixture of arsenous acid and hydrochlorate of cocaine, equal parts, rubbed up or triturated with lanoline. It makes an easy paste to handle, and my experience has been that the application of it is without pain. I always note just how much arsenous acid is put into a preparation, that I may know what the twenty-fifth or fiftieth of a grain is.

Dr. Fillebrown.—If I understood Dr. Potter's question, it was not relating to the preparation which was easiest to handle, but to the one that would give the least discomfort to the patient in its application. I am inclined to think that any arsenical preparation applied to an inflamed pulp will give pain, and to make an arsenical application comfortable we must first reduce the inflammation. I never apply arsenic to a painful pulp. I invariably quiet the pain with a sedative, and often wait until another sitting before applying the arsenic. This plan produces the best results.

I object to a paste, although having used it for a number of years, because it is difficult for inexperienced persons to judge of the amount that they are putting in. They also want to be very sure that the arsenic does not come out, so they take a piece of cotton and put it into the cavity and press it home, hard and solid, and then put a large piece of gutta-percha over that. Of course that acts as a plunger and squeezes the arsenic out, and it impinges upon the membranes and produces that excruciating pain which is so vividly described in Dr. Daly's paper. In one case where necrosis followed, I found out absolutely that that was the cause. Another case resulted in a severe sloughing caused by the operator perforating the side of the root, thus allowing the paste to come in contact with peridental membrane. If there had been no pressure in either of those cases there would have been no trouble. The safest form in which it is applied at the present day is that suggested by Professor Flagg. Arsenous acid and creosote are mixed in due proportion and thoroughly diffused through some cotton

fibres which have been finely chopped up. This preparation is a convenient one to handle. It is not necessary that you should put in the twenty-fifth or fiftieth of a grain; the one-hundredth of a grain will be as effectual as a grain. By first allaying the inflammation by applying sedatives, I feel that I am perfectly safe, and will be sure to give the patient no discomfort whatever, and have the best promise of success in devitalizing pulps. Gold wire for filling the apex of roots was recommended by Dr. Morrison, of St. Louis, about twenty years ago. My objection to it is the difficulty of removing it. At the present time we think it is better to be able to remove the filling and give the patient relief if trouble arises, and later, fill again. During many years of my practice it was the fashion to fill roots with gold-foil, and that was the method which I practised, and I am sure I filled curved roots. A few years since I was challenged on this matter, and I took a tooth that had a curved root and opened it up and removed the pulp, and then went on and filled it with gold-foil. I then filed through the root on the side of the curve, and, as I confidently expected, found the canal filled beyond the curve at the apex. I did it right before the eyes of the challenger, and he was quite willing to admit my success. It is generally thought now that gutta-percha and the phosphates are better. I prefer the gutta-percha, because it is difficult to carry the phosphates to the end of the root,—the residual air there is apt to form an impediment. All the gutta-percha is easily removed.

President Smith.—We next come to the "Incidents of Practice," and under this head will call upon Dr. Henry F. Libby, of Boston, who will exhibit a dental air-heater and annealing apparatus.

Dr. Libby.—In the practice of dentistry as now conducted the many operations to be performed call for apparatus of a more or less varied character; and the simplicity of such apparatus, and the rapidity with which different forms may be changed and handled, have a direct bearing upon the amount and character of the work performed by the dentist.

Accuracy is of great moment, and yet in several operations the judgment of the operator is at present the sole guide, as, for instance, in the use of the hot-air syringe or chip-blower. When it is desired to use the instrument, it is held over the flame of a lamp until the operator thinks the temperature of the heating chamber is about right, when, as a matter of fact, the temperature may be many degrees removed from that desired.

After its use the instrument cools down, and must be again

heated, so that in addition to the inaccuracy described, its use involves much loss of time to both operator and patient. Again, it is frequently desirable that a gutta-percha heater or annealing-tray may be brought into temporary service, rapidly and without necessitating the arrangement of separate and more or less extensive paraphernalia, for the different apparatus must be put aside out of the way after use; but, as far as I am aware, the different operations of heating gutta-percha or annealing gold are now carried on with the aid of separate apparatus, one of which is removed before the other is brought into use.

This invention has for its object the production of a heater and annealing apparatus particularly adapted for operating rapidly, comprising various parts and features whereby different operations may be carried on without loss of time, the arrangements of the several parts being compact, simple, readily and quickly adjusted, and in condition for immediate use at all times.

FIG. 1.

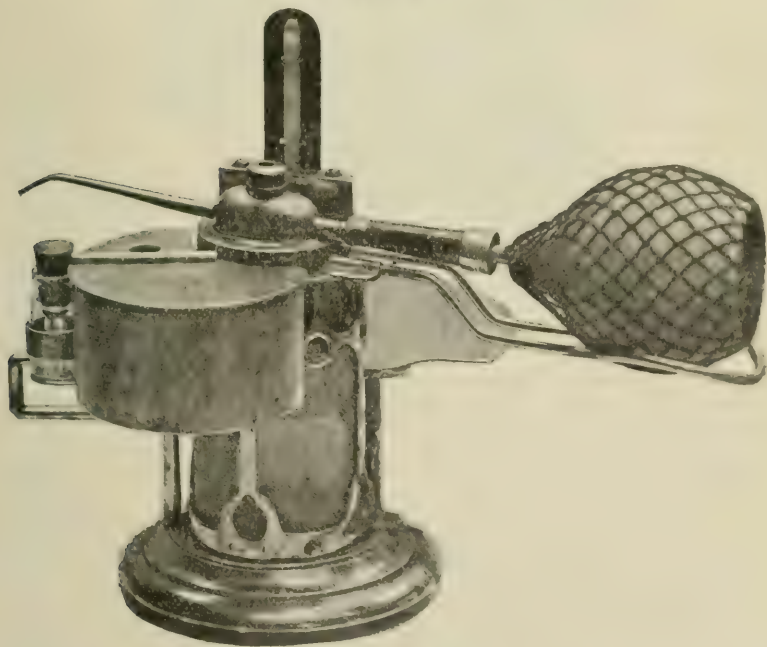


Fig. 1 represents the perspective view of the apparatus as it naturally rests upon the bracket, with the reservoir in contact with the body of the heater.

Fig. 2 represents the body of the heater thrown laterally to one side, allowing the annealing-tray to be brought into position over the lamp or Bunsen burner, and the pivoted reservoir swung to one side.

FIG. 2.



The base of this device, as represented in the figures, is made quite heavy, and of sufficient size to form a firm support for the different parts.

The body frame is surrounded by wire gauze to protect the flame from draughts when in use, and to better protect its heat. In the upper part of this cylindrical framework is the sand-bath, consisting of a metallic case, and filled with sand or fine quartz.

This medium gives a uniform temperature, in which is placed the bulb of a thermometer extending into the bath; this registers the degree of heat required. In the top of this chamber is a receiver projecting into the sand, which corresponds with the elongated bulb of the hot-air syringe or chip-blower.

It is obvious that when the sand-bath is swung into position over the lamp the temperature of the bath will be accurately registered on the index of the thermometer, and the temperature of the receiver will be that of the bath, likewise that of the chip-blower, which, being placed in the receiver, will very shortly be

raised to the temperature of the bath, and can in consequence be accurately determined by a glance at the thermometer.

The bulb of the chip-blower is filled with copper wire for the purpose of retaining heat, which it does sufficiently long to dry a devitalized tooth.

The temperature required for chip-blowing is 300° F. In order to provide means for heating water to different temperatures without necessitating the use of separate and cumbersome apparatus, I have secured a standard to the base, upon which is pivoted the water reservoir, made of metal, and having a metallic cover, which is provided with a small opening for the use of the water syringe.

The reservoir is shaped to correspond to the cylindrical side of the sand-bath, so that it may be swung up against the latter and rapidly heated by conduction.

The flanged portion of the water-bath resting on the annular ledge of the heater can be readily regulated by moving it towards or from the body heater. The metal top or cover of the water reservoir serves as a gutta-percha heater, and absolutely prevents any burning or overheating of the material.

In connection with this, on the outer side of the water-bath is an annular holder, which is a convenient device for holding a small vial containing an obtundent, which is also heated by its proximity to the water-bath.

The annealing-tray, as shown in Fig. 2, being swung into position over the flame, has a diameter of four and one-half inches. This is supported by an upright standard secured to the base.

WILLIAM H. POTTER, D.M.D.,
Editor American Academy of Dental Science.

ACADEMY OF STOMATOLOGY.

MEETING held December 10, 1894.

DISCUSSION OF DR. TRUMAN'S PAPER.

(For Dr. Truman's paper, see page 11.)

Dr. Kirk.—I am exceedingly gratified that Dr. Truman has investigated this subject so minutely. It is one in which I have been very much interested for some time.

In respect to coagulants, my own research was simply to decide

the question whether they were self-limiting, or set up self-limited barriers to their further penetration, and I demonstrated to my own entire satisfaction that they were not self-limiting.

The phase of the matter which Dr. Truman has presented here to-night is one which I can hardly discuss. It will need a careful study of the paper, involving as it does the question of the relative diffusibility of these substances before it can be discussed intelligently.

There is a matter that I think Dr. Truman thoroughly recognizes, but it should be noted here, and that is, that the diffusibility of a coagulant substance may be varied, by differences in the strength of its solution, as by using different dilutions we get different effects: differences in density of coagulation and different rates of diffusion.

As to these two teeth respecting which Dr. Truman has asked my opinion, in one the inlet tube seems to be stopped up. I should say that the failure in this case to get the effect of the chloride of zinc through the cemental wall was due to a stop or break in the continuity of the column of zinc chloride solution. The tube appears to be plugged up with something.

I spent a great deal of time before I could get a perfectly solid column of liquid between the pulp-chamber and the inlet tube in the experiment of which this is the duplicate. I found, I suppose, in a half-dozen cases, or may be more, perhaps ten cases, in arranging the inlet tube in contact with the tooth, that I had great difficulty in getting a continuous column of liquid.

I know that the teeth Dr. Truman examined in my laboratory afforded, to my mind, conclusive proof that the zinc chloride had penetrated the cemental wall.

Dr. Truman.—So I thought at the time.

Dr. Kirk.—As to its being a question of a crack at the bifurcation of the root, I remember in one of my experiments coagulation took place at the root bifurcation, and I attributed that not to the supposition that there was an anatomical break here, but to the fact that the structure was thinner at that point, and the zinc chloride solution following the shortest course coagulation was started at that point. In the other cases it did not tend to start at the apex of the root, but near to the juncture of the enamel cap with the cementum. That is where coagulation occurred in the case that I reported as successful, which I exhibited in New York. Unless it was a break in the tooth-structure, it must have penetrated through the cemental wall, in my judgment.

I am quite interested to hear the views of Dr. Harlan on the subject. It is a very fortunate coincidence that he is with us this evening. We have been hearing so much on this one side of the question that I am sure it will be gratifying to all of us to hear the other side of the case stated.

Dr. A. W. Harlan, Chicago.—Mr. President and gentlemen, it is a very happy accident that brought me here this evening. I was entirely unaware that the subject was to be discussed, and I did not know that a paper was to be presented. I did not come forward at this time to state the other side of the question, because I am going to do that in New York, at the January meeting of the First District Dental Society, but I am going to make two or three queries which may have some bearing on this matter.

The first one is this: If zinc chloride is such a powerful penetrating agent, why is it that it does not preserve the portion of the pulp that is dead and left in a root that has been treated with zinc chloride and afterwards had a root filling placed over it?

If carbolic acid is such a powerful penetrating agent in the apical portions of a dead pulp, why is it that an abscess inevitably follows after an incomplete root-filling, when that portion of the pulp has been thoroughly soaked and saturated as far as it may be with carbolic acid? If creosote, which is practically (or partially) soluble in water, is applied for weeks and months to these stump-ends of dead pulps, and afterwards a root-filling is introduced, whether it is metal or oxychloride of zinc, or gutta percha, or any other agent that will not force the portions of the dead pulp through the root, why is it we subsequently have an abscess if these are antiseptic as well as coagulating agents? Mr. President, it seems to me this is one of the questions that ought to be settled. I deny (without giving my reasons now) that zinc chloride or carbolic acid or creosote or bichloride of mercury—these are the four agents, I think, that have been mentioned here—are powerful penetrators of albuminous matter in living teeth.

I will give the reasons at the First District Dental Society of New York.

Again, the handling of pulpless teeth successfully by the men in this room has been largely brought about by the agitation of the question of the use of coagulating agents. Well, perhaps I am one of the guilty ones. I spent a great deal of time on it. I read the first paper on the subject in October, 1881, in Cincinnati, and from that time to this I have been engaged with matters in this connection.

I do not expect any one to answer the queries I have presented here to-night, because there is no man in the room who does not know that it is true that abscess almost invariably follows after the treatment of stump ends of dead pulps of teeth that are left there, and when the whole pulp has been soaked for weeks and months with creosote, and the tooth has afterwards been filled. Unless some change has taken place that will produce an encystment of the apex of the tooth, there will be an alveolar abscess there,—blind or with a fistula.

One of the reasons why a coagulating agent is not a fit substance to use in pulpless teeth is, that a coagulated body is the fittest food for micro-organisms. Dr. Truman smiles. Ernest LaPlace, of Philadelphia, I believe, is one of the authorities for that statement. W. D. Miller is also another authority. Hueppe is another. Koch is another. I do not need to mention others to the effect that a coagulated body is the fittest food for micro-organisms.

Dr. J. Y. Crawford, Nashville.—I have been very much entertained with the paper, as well as very much interested in the discussion. I would not presume to interject any crude and unprepared remarks. I have some views, it is true, but for fear they might mar the scientific trend of thought thus far expressed, I would prefer not to make them known.

Dr. Gordon White, Nashville.—I am entirely undecided on these subjects. I have made some little investigation, but nothing that has proved entirely satisfactory to my mind, as to which is the best agent to use. I find that in root-canals perfectly filled I have very little trouble with them afterwards.

I am, indeed, very glad to have this opportunity of listening to the paper and hearing the discussion from the gentlemen who have preceded me.

Dr. C. R. Butler, Cleveland.—I am, as several others have expressed themselves, unable to go into this discussion with any degree of intelligence. It has been presented in an altogether different manner from anything I have ever heard before. It seems to be based upon thorough investigation, and is, to a very large extent, original. It is a question that has been perplexing practitioners all along. It seems as though this all-important question of the treatment of pulp-canals or pulpless teeth was about to be settled, so that we would have some intelligent line of practice and mode of handling them, so that we would not be all at sea.

Dr. C. S. Butler, Buffalo.—I learned a week or ten days ago that Dr. Truman would present a paper upon this subject to-night, and I

thought I must, if possible, get to Philadelphia and hear the paper, which, to my mind, is the clearest presentation of that phase of the subject I have ever heard. I look forward now to the time when I can study it at my leisure and get a better comprehension of it.

Dr. M. L. Rhein, of New York, expressed his pleasure at having had the opportunity of hearing the paper, and believed, with the others, that it was a paper which required careful study at leisure, to enable one to determine the exact value which it unquestionably possesses. He thought, with one or two of the preceding speakers, that the points under consideration were nearer solution than they had ever been before in the history of our profession.

Dr. Charles J. Essig.—Mr. President and gentlemen, I did not intend to enter into the discussion, but I have been listening with a great deal of pleasure to Dr. Truman's paper. It occurred to me that the sense of the paper was not so much as to the value of certain agents in root-filling, or in the treatment of roots, as it was of the relative penetrating power of certain agents. And while I think his paper was a very valuable and thoughtful one and a good one in every respect, still I conceive that in order to determine a question of that kind it would be necessary to take up a series of the most careful experiments, and the nearer we could come to the condition of the mouth, the better able we would be to demonstrate the penetrating power of certain agents.

It would be necessary, it seems to me, to take pulpless teeth and fill the roots with an agent and subject them to the temperature of the mouth for a certain length of time, and then make microscopic sections of the tooth and examine them under high power, to determine the penetrating power of certain agents.

I do not understand Dr. Truman's paper as condemning coagulants in the treatment of pulpless teeth. As I understand it, the point of his paper was what the relative penetrating power of certain agents would be.

I should imagine that such a matter could be very accurately determined by a series of experiments with microscopic sections, but I cannot see how we can arrive at anything by a few experiments with glass capillary tubes, considering that they present different conditions entirely from those we meet in the mouth or teeth; and while it is of a great deal of value to observe these subjects even in the light in which they are here presented, it would be better still to first demonstrate beyond a doubt by very correct experiments, such as I have alluded to, which could be done if we

could find the time and the enthusiasm, after the day's labor, to prosecute such work. It would be very difficult, as all such experiments are.

Now, while the specimens were going around, I could not help thinking of the experiments we used to make with amalgams, of filling glass tubes and then subjecting them to certain theoretical tests, and it was not until we brought them as near to the conditions of the mouth as possible that we began to learn something. When the experimental test fillings were subjected to the fluids of the mouth, at the temperature of the mouth, we found they behaved almost the same as they did in the mouth.

Dr. A. H. Porter.—I believe that in pathological treatment the more nearly it is identical with normal physiological action the more it is to be desired. In the formation of the tooth-substance from the blood-plasma nature has a certain purpose to effect. In any cell-proliferation where a dense, hard structure is to be produced, as in the odontoblastic formation, we have virtually a natural coagulation.

The main factor to be considered in an organ exposed to the impact of an external environment is its resistance to pressure. According to the strength and duration of this resistance is the vaso-motor mechanism called into play and the metabolic and circulatory activities regulated.

In the case of the visual and aural apparatus, these activities are at a maximum on account of the rapid, oscillating character of the ethereal and aerial environment forming light and sound.

In the case of tooth-structure, however, nature opposes a mechanical strain of comparatively long duration.

This permanent force is met by the permanent structure of enamel and dermal appendages generally where the circulatory activities are at a minimum.

The artificial coagulation demonstrated by the essayist approaches this condition, and is to be valued for its experimental character.

Dr. Kirk.—One point has occurred to me since Dr. Harlan spoke, and it seems to me his queries ought not to go by without some further consideration.

I believe it is undoubtedly true that coagulants form a suitable pabulum for the growth of certain micro-organisms, but what coagulants? Under what conditions? In an editorial in the *Dental Cosmos*, perhaps two years ago, I called attention to this same point, and it seems to me very important that when a coagulum is

formed with any substance capable of producing coagulation when brought in contact with albumen or gelatin, we should recognize that we are producing a chemical compound by chemical reaction, and that it is a reaction which follows the law of all chemical combinations,—viz., it takes place in definite proportions by weight, that is, the relationship between the amount of coagulant required and the amount of albumen required to produce coagulation is exact and definite.

Now, if you produce a coagulum in an excess of albumen, you produce a compound which has no resulting excess of the coagulant. With, for example, zinc chloride, or bichloride of mercury, you can produce a coagulum that has no excess of the original zinc or mercury salt. Having the albumen in excess, all of the zinc chloride or sublimate has been used up in forming the coagulum, the compound is exactly balanced, and you thus have no doubt a coagulum which is, as it has in fact been demonstrated to be, a suitable pabulum for certain kinds of micro-organisms to grow upon. After you have formed your coagulum, however, if you provide an excess of the coagulant antiseptic, then you must certainly render the coagulum antiseptic, exactly the same as you would any other substance or tissue under the same circumstances. The bichloride of mercury or zinc chloride then being free to act, the question resolves itself into one of how long will this excess of antiseptic material remain active, and what is its antiseptic value.

Neutral coagula, in which there is no excess of the antiseptic which was used to form the coagulum, probably have little or no antiseptic value. Therefore, if you wish to get an antiseptic condition of a coagulum, you will have to use an excess of the coagulating substance.

The statement that Dr. Harlan made seemed to me to need that much qualification at least, to give us the right view of it. I hope the discussion of the subject will go on until we do know something more definitely about the proper position of these agents in the treatment of root-canals.

Dr. James Truman.—I had intended answering Dr. Harlan in the manner so ably illustrated by Dr. Kirk. We sometimes bow to authority without proper examination. I have never been able to make cultures on the class of coagulants described by Dr. Kirk, and I do not regard it as possible within a reasonable period. Again, I do not believe in Dr. Harlan's assertion in regard to the coagulating process, as he terms it, on the stumps of pulps. I do not believe that inevitably alveolar abscess follows that sort of

treatment. On the other hand, I am well satisfied that it does not follow it. This is simply dogmatism, so is the other.

In reply to Dr. Essig's remark, that "this is not a carefully prepared paper——"

Dr. Essig.—No, not that; but that it did not go far enough.

Dr. Truman.—I admit that the paper is not exhaustive, but the experiments were, and if they were not, I do not know how they can be made so. I have spent three months on these, and have repeated them over and over again. It is true others may have been able to conduct them more successfully. I cannot conceive how it would be possible to make any essential difference by keeping the tubes at the temperature of the mouth. He asserts there was not sufficient care in microscopic experiments.

Dr. Essig.—I beg your pardon, I have not seen any microscopic specimens at all.

Dr. Truman.—My feeling was that the sections prepared in the course of these examinations would not be understood by all present. It was my ambition and desire to carry the stain with the coagulation into the tubes of the dentine, but I could not accomplish it. The coagulation would invariably leave the stain. All the stains with which I was familiar were tried, and I then consulted with the histologist of the department of medicine, University of Pennsylvania, but with no satisfactory result. Nitrate of silver will penetrate the tubuli without difficulty, but the stain is deep and so thorough as to render it almost valueless for observation. I have specimens at home and will be pleased to show them, but I did not think it worth while to bring them here to-night.

I have spent a large portion of my life in some forms of histological work, and I should know something about it; at all events, I do know how to differentiate normal tubes from those which contain coagulum. The whole character of the protoplasm is changed, and the tubes are so nearly obliterated that it becomes a matter of difficulty to trace the outlines of the original walls. My greatest desire is that this question should be settled, and I have tried to do something towards this end, and must believe that the work shown to-night carries it nearer a solution.

The subject was then passed.

INCIDENTS OF OFFICE PRACTICE.

Dr. Guilford.—We are now on the eve of commemorating the discovery of anesthesia, and it seems to me that we should not lose sight of the fact that there is always some danger connected

with the anæsthetic state. It so happens that during last week some of our visitors who came from Buffalo brought with them an apparatus for producing forced respiration in cases of asphyxia, and exhibited it at one of the dental colleges in this city last Saturday. It excited so much interest that I took the liberty of asking Dr. Butler to exhibit it here to-night.

Dr. C. S. Butler.—It is only because I feel the importance of it to our profession, and perhaps because it may be new to some of you, that I have consented to come before you. It is simply an apparatus for use in cases where asphyxia has followed the administration of anæsthetics. It sometimes occurs that, notwithstanding all our methods of artificial respiration, we are unable to resuscitate the patient, or, rather, re-establish normal and natural respiration, and, consequently, the patient dies. It has been the opinion of the medical profession, on the other hand, that forced respiration should never be resorted to. Even as late as 1892, Dr. Marshall Hall, the celebrated English physician, stated in his "Hand-Book of Ready Reference," in cases of asphyxia, that forced respiration and the bellows should never be used. Three cases which have come under my personal observation satisfied me that the danger of forced respiration is entirely misconceived. It has been conclusively shown that forced respiration may be applied and the patient brought back to life again.

I will cite two cases of nitrous oxide asphyxia with which I am very familiar. One where the patient died; the other where the patient was saved. The first was that of a married lady below middle life, who came to a dentist in the city where I reside, and had nitrous oxide administered for the purpose of having a tooth extracted. She had taken the gas successfully on other occasions, but on this occasion, after the operation, it was observed that the patient had ceased to breathe. A messenger was despatched for a physician, and two physicians, who lived near by, came in a few moments, and made efforts to resuscitate the patient or to re-establish respiration, but without result, although the patient's heart continued to beat regularly and strongly for fifty-five minutes.

The other case occurred last July, in Buffalo. A lady, a trained nurse,—I mention that fact to show that she was of more than the average intelligence in regard to medical matters,—applied to one of my brother dentists for the administration of nitrous oxide for the extraction of a tooth. The nitrous oxide was given to the extent, perhaps to the amount, of six gallons, and the tooth was extracted; no unusual condition apparent during that time. For a

moment or two after the tooth was extracted my friend noticed that she was not breathing. He endeavored to re-establish respiration by methods he had used on previous occasions, by opening the waist-bands and loosening the corsets, and endeavored by telescoping the short ribs suddenly, by placing his left arm beneath the patient's right arm, reaching over and letting go quickly. This failed of the desired result. He then despatched his assistant for me, and also, at the same time, to the nearest telephone to call the hospital ambulance, and with the request that they bring their forced respiration apparatus. I hastened at once to the patient with my friend Dr. Low, who was in the same building, and for about twenty minutes, or until the arrival of the ambulance, we worked by placing her on the floor, with shoulders elevated, by the Sylvester method of artificial respiration. It was probably twenty-five or possibly thirty minutes before the arrival of the hospital surgeon, and the apparatus for forced respiration was applied. In possibly twenty-five or thirty minutes after the forced respiration had been commenced the patient was able to be moved to the hospital, and in two hours after arriving at the hospital she was able to go about her usual duties. Now, there is not the slightest doubt in my mind that without the forced respiration apparatus she would never again have breathed normally, and would have died. Indeed, she came near dying after the surgeon arrived, her heart having nearly ceased to beat.

Another case of narcotic asphyxia from narcotic poisoning probably illustrates the value of the apparatus better than any other. It was the case of a young physician recently graduated, and who had just entered upon his professional career. Through an unusual number of coincidences he had been deprived of the normal quantity of rest and sleep for a period of five days and nights, and in order to sustain himself and continue his duties he had begun the taking of strychnine as a stimulant to brace him up. On arriving at his office about half-past one at night, he went into the bath-room and injected into his arm one-fortieth of a grain of strychnine; feeling no effect, two or three minutes afterwards he injected two-fortieths, and in a moment later another fortieth; beginning to feel some tremor, but having no apprehension of danger, to counteract it he began to use morphine hypodermically. This he continued as long as he was conscious. He was found in this condition at seven o'clock in the morning in the bath-room by his father. Physicians were despatched for at once, and at half-past seven a physician arrived with the forced respiration apparatus.

It was immediately seen that the case was a serious one, and they performed tracheotomy in order to facilitate enforced respiration, and for three days and nights continuously, with cessations a few moments at a time, the physicians and nurses continued to breathe for their young physician. During the seventy-two hours there was probably not more than fifteen minutes during the whole time in which the patient was physically able to breathe by himself, although after a few hours on the third day he was thoroughly conscious of all that was being done for him, and after a few hours spoke in a low whisper, but was still unable to breathe by himself. At the end of the seventy-two hours he was able to breathe quite comfortably, and very soon regained normal vigor, and in a few days went about his professional duties.

These three cases, it seems to me, establish very clearly the false position in which the medical world has held forced respiration. Since gentlemen in our city began to use the forced respiration method there have been saved by it over fifty persons who, humanly speaking, without forced respiration would have died.

A demonstration of the apparatus and its method of use was then given by the speaker.

Dr. Kirk, on behalf of Dr. Essig, presented to the museum some specimens of abnormal teeth, consisting of two pairs of teeth with roots fused together. A specimen also, of an upper cuspid having two roots; another, a pathological specimen of which there is no description. Also a preparation of lithium bitartrate, sent from London. Dr. Kirk said in regard to it,—

“I wrote a communication some time ago on the lithium bitartrate as a remedy in lithæmia, and especially the cases of lithæmia which result in certain forms of pyorrhœa alveolaris. The preparation is made by Alfred Bishop, of London, in the granular effervescent form. It was suggested to him by reading a paper, to which I have referred, in the *Lancet*. I suspect, although I do not know, that it contains something besides lithium bitartrate. It is marked as containing five grains of lithium bitartrate to a drachm of the powder or granules, and I presume that the balance of fifty-five grains of the material is possibly bicarbonate of sodium or potassium, to bring about the effervescent quality.

“I have another preparation here, made by McKessin & Robins, of New York, which they call tartarlithine. It contains nothing in the shape of other alkaline salts, and is effervescent. It has added to it a small amount of saccharin to modify the sharp acid taste.

This preparation is the one I have been using most successfully in my own work.

"I would like to say that if there are any gentlemen present sufficiently interested to observe cases under treatment of this particular lithium salt, and I find it has a value considerably above any of the lithium preparations I have ever tested, I will be very glad to furnish him with the necessary material to do it."

Dr. Deane.—We have from time to time in our Philadelphia Society heard of English teeth and of their fine texture. We have in the Pennsylvania Dental College a young Englishman who brought some of Ash's teeth with him, and asked permission to put them on a plate,—bridge-work. I borrowed it this evening to show it to the members of the society. It may prove to be interesting to some. The teeth are set on a pin, and cemented by melted sulphur. He has left the first bicuspid loose so it can be taken off. The teeth seem to be as fine on the inner portion where the tooth is ground out as they are on the surfaces. He tells me they have no trouble in splitting or breaking when they are fastened on the plate by the sulphur. The bridge is made of German silver, and not intended for fine work other than the ordinary college work of the junior year.

Adjourned.

GEORGE D. B. DARBY,
Secretary.

MEMORIAL CELEBRATION OF THE FIFTIETH ANNIVERSARY OF THE DISCOVERY OF ANÆSTHESIA.

THE celebration of the discovery of anæsthesia, in Philadelphia, December 11, 1894, will take rank as being one of the most important, if not the greatest celebration that dentistry has ever attempted in this country, the Columbian Dental Congress excepted.

When the American Dental Association, at Old Point Comfort in August last, decided to hold this in honor of Wells, the discoverer of anæsthesia, it was with some doubt as to the possibility of interesting the profession generally throughout the United States, sufficiently so, at least, to induce them to leave their homes at a busy season of the year. The result shows that this was, to a large degree, an error, for the representation from fourteen States was not only good as to number, but also represented in quality the best thought in dentistry.

The meeting assembled promptly at 2 p.m. on Tuesday, December 11, and notwithstanding the inclemency of the weather there was a large and enthusiastic audience present.

The meeting was opened by Dr. J. Y. Crawford, President of the American Dental Association, in a few brief remarks explaining the reasons that influenced the American Dental Association to call this memorial meeting, and he then introduced Dr. Thomas Fillebrown, of Boston, who presented the history of the development of anæsthesia from the earlier periods of human history until it culminated in the final discovery by Wells. It was a masterly argument, and held the undivided interest of the audience until its close, and will bear careful perusal and thoughtful consideration by our readers.

(The address will be found on page 1.)

The President then presented Dr. James E. Garretson, of Philadelphia, Professor of Anatomy and Surgery, Philadelphia Dental College. Dr. Garretson took the philosophical and humanitarian side of the question. His scholarly presentation of the deeper thoughts underlying this discovery was given very effectively. The contrast drawn between the surgery of to-day, illustrated by a recent case of his own and that of the mother and the child, was an impressive piece of work, and coming from the great surgeon as an experience, was worthy of being embalmed in the memories of those present.

At the conclusion of this address Dr. G. Q. Colton, of New York, was discovered in the audience, and was at once invited by the President to a seat upon the platform as the surviving representative of that now historical experience in which Wells had his own tooth extracted, he, Colton, giving the nitrous oxide. In a remarkably clear voice for a man of eighty-one he detailed the facts as he knew them, greatly to the interest of those present. It seemed almost impossible that a man could be present and take part in this celebration of an event, in which he was one of the principal actors, fifty years ago. It seemed to bridge, most satisfactorily, the present with the stirring streams of life moving during the first half of the present century towards a higher development of dental work.

Mr. Charles Wells, son of the discoverer, was introduced, and expressed his thanks for the honor, but excused himself from speaking at that meeting.

Dr. L. D. Shepard, of Boston, then moved that the meeting adopt a reaffirmation of its appreciation of Dr. Horace Wells's discovery. This was approved.

Dr. Robert Huey, of Philadelphia, moved that a committee be appointed to consider the erection of a monument to Dr. Wells in Washington, D. C. This was also adopted, and Dr. J. D. Thomas, of Philadelphia, was appointed treasurer.

The meeting then adjourned to meet at the banquet, Union League Club House of Philadelphia, at 6.30 in the evening.

This now historic building never seemed so inviting as it did on that evening as the guests assembled in its spacious library room. The professions were well represented by one or more from each. The brilliant lights and profusion of flowers combined to give the occasion its appropriate setting. The interchange of greetings between old professional friends and the introductions to new ones made the waiting hour a very agreeable part of the day's work.

The opening of the large doors and the march into the magnificent dining-hall of the League was a surprise to all, and loud expressions of the beauty of the scene were heard on every side. The hall is capable of accommodating large numbers. Its perfect appointments made a most effective background to the beautifully decorated tables. The walls were banked with palms, flowers everywhere, giving fragrance, beauty, and poetry to the scene. The dazzling electric lights reflected on "crystal touching crystal" of the costly chandelier seemed to send a glow of pleasure to every guest, and doubtless also a feeling of satisfaction to the committee having the celebration in charge that their labors were receiving a due reward. The expressions of regret were general that the scene could not have been witnessed by every thoughtful dentist of the land. It was very impressive, and the speeches of the evening seemed to reflect the consciousness of an overpowering influence for good. It was a glorification not alone of Dr. Wells, but it represented that nobler humanitarian influence that seems to be developed on special occasions as an evidence that underlying all selfishness there is an under-strata of eternal good that somewhere and somehow is destined to regenerate the race.

The menu was rapidly passed over. It was excellent in quality and well served. At the conclusion of the gastronomic part of the proceedings, Professor E. T. Darby called the attention of those present to the importance of the occasion and its possible far-reaching effect. Horace Wells was a citizen of Hartford, and it was fitting that a distinguished representative from the State of Connecticut, United States Senator General Joseph B. Hawley, should respond to the toast "The Horace Wells Discovery."

The Senator took up the history of the introduction of anæ-

thesia, and said he had never before been so impressed with the importance of this great subject as upon the present occasion. He pictured the sufferings of the people of past centuries, and contrasted these with the present freedom from pain. The feelings of the residents of the city of Hartford were graphically described, the enthusiasm of the old men, prominent in that city's life, who came out the evening previous at Hartford's celebration of the discovery of anæsthesia, and remained until after one o'clock to assist in placing a memorial tablet to the honor of her great citizen Horace Wells. He mentioned the work of Hon. Truman Smith, and closed by expressing the deep pleasure it gave him to take part in this celebration.

Professor Darby then called on Dr. James Truman, Professor of Dental Pathology, etc., University of Pennsylvania, of Philadelphia, to respond to the toast "Anæsthesia as a Dental Discovery."

He began his remarks by alluding to the story of Hans Christian Andersen of "The Ugly Duckling," and compared this experience with that of dentistry. It was born late into the professions. It had undergone contumely and criticism, but nevertheless it had grown and developed,—if not into the beautiful and graceful swan, had, at least, advanced into the higher walks of professional life. This, he conceived, was demonstrated in innumerable ways, but in no one more striking than the fact that fourteen States were represented at this banquet. When this was remembered as meaning personal sacrifice to all and days of travel to many, it proved to his mind that the dental profession was beginning to learn the great lesson of what is meant by professional spirit, and this evidence rejoiced his heart on this occasion.

He elaborated on the work of Horace Wells. His unselfishness; his desire to spread this blessing broadcast into "the greater world," as Goethe loved to call it.

Horace Wells was the discoverer of anæsthesia. When Dr. B. W. Richardson, of England, in a recent article in *Longman's Magazine*, attempted to tear the mantle from Wells's shoulders and place it on Sir Humphry Davy, he made the blunder of his great life.

Dr. Truman then quoted from Richardson's account of the condition of surgery just prior to the introduction of anæsthesia. The anxiety of the surgeon, the horror of the students, and the terror of the patients were given by Dr. Richardson with a vividness worthy a master. His graphic account of the reception of the first news received from Massachusetts Hospital, and of the first operation performed in his presence in England; and yet, at this

time, England had forgotten that Davy had ever mentioned nitrous oxide in connection with the amelioration of pain.

Dr. Truman compared this work to other discoveries, and spoke of the inspirations floating in the mental ether of the world and falling like the dews of heaven, as in the parable, some on rocky soil, some on poor, and others on fruitful soil. It fell to Priestley, and there was no germination; it fell on Davy, and ended in a weakly plant,—a dream; it fell upon Horace Wells, and the plant grew, to the comfort and happiness of the nations.

Dentistry, in his view, had not reaped much benefit from this discovery. When Horace Wells lived and worked this profession was in a transition state. Anæsthesia was important then for both patient and operator, but dentistry has now far outgrown this condition, and beyond the necessity of extracting teeth to the extent then required by existing knowledge.

He said we might well adopt the old Delphian idea and hang the "leaden forceps" in our temples—our offices,—an emblem to us that teeth are not to be removed until such an instrument could extract them.

He then pictured the horrors of the battle-fields of past centuries, the terrors of the hospital, and the sufferings in the accidents of life, and said, "Who can translate these into words suitable for modern comprehension?"

"The wail of the ages was voiced in the garden of Gethsemane when the Great Master of Human Thought, in anticipation of the cruel agonies of the cross, cried aloud, 'Father, let this cup pass from me.' Eighteen centuries passed into oblivion and there came no response, but near high noon on the nineteenth, in the New World of Columbus, in a humble home at Hartford, a 'still, small voice' was heard sounding above the wilderness of suffering; it was wafted over the deep waters; it echoed and re-echoed in joyous acclaim throughout the world, 'Lo, the cry of agony from the surgeon's knife is silenced forever!'

"We cannot deify thee, but we give thee most hearty thanks, and in our heart of hearts we enshrine thee, O Anæsthesia, goddess of our modern civilization, though not the first-born, the loveliest of all the children of discovery, in this our nineteenth century."

Dr. J. William White, Professor of Clinical Surgery, University of Pennsylvania, then responded to the sentiment "Anæsthesia as a Factor in the Evolution of Surgery." He paid a glowing tribute to Horace Wells, and said, "If this discovery did nothing more than blot out the suffering of the patient, it had justified a hundred

times over this commemorative gathering. The brilliant thought of Wells," he remarked, "so broadened the field of surgery that it made possible the discoveries of Pasteur and other great men twenty-five years later."

Dr. H. C. Wood, Professor of Materia Medica, Pharmacy, and Therapeutics, of the University of Pennsylvania, spoke on "The Debt of Medicine to Anæsthesia." With his usual eloquence and energy he advocated the necessity for vivisection, but, he said, few would have the cruelty to injure animals without anæsthesia. In this sense has anæsthesia made progress possible with all the great bodies connected with medical science.

Over against medicine stands the ignorant public in opposition to this necessary method to advance medical knowledge.

It is a truth that medical men are not rewarded. No statues are erected to doctors; dollars and cents rule the world.

He said it was a great thing for Hartford to place a tablet in commemoration of the discovery of anæsthesia by Horace Wells, but why did not the city raise a monument to his memory and great services?

Senator Hawley explained that the city of Hartford had erected years ago a monument in the form of a full-length statue.

Colonel Alexander McClure, editor-in-chief of the *Philadelphia Times*, spoke on "The Mastery of Pain from the Stand-point of the Layman." He was greeted with much applause, and delivered one of his delightful after-dinner speeches, abounding in genial wit and appropriate allusions.

He took the position that anæsthesia gave to medicine the opportunity of attaining the highest art in surgery. Operations were performed to-day with ease and certainty impossible before its advent.

He deprecated the fact that the prejudices of the ignorant had, in a measure, dwarfed medical science under the belief that vivisection was cruel, but that in the end these would be conquered and the world would progress in spite of such opposing forces.

Dr. Wilbur F. Litch, Professor of Prosthetic Dentistry, Materia Medica, and Therapeutics, Pennsylvania College of Dental Surgery, followed on "The Development of our Knowledge of Anæsthesia."

He remarked that the occasion brought to his mind with renewed force the observation of Lecky, the distinguished English historian, that "It is probable that the American inventor of the first anæsthetic has done more for the real happiness of mankind than all the moral philosophers from Socrates to Mill."

He quoted the great French surgeon Velpeau as saying, in a work published in 1832, "To avoid pain under incisions is a chimera which is no longer pursued by any one. A cutting instrument and pain in operative surgery are two words which never present themselves separately to the mind of the patient, and of which he must of necessity admit the inevitable association," and commented upon Velpeau's changed attitude when in 1847, before the French Academy of Sciences, he gave an account of his successes with ether, and reported that he had, among other operations, "removed an enormous cancer from the thigh of a man who had not the slightest perception of the operation."

Dr. Litch affirmed that to Horace Wells more than to any other man the world was indebted for the beneficent discovery which made Velpeau's radical change of opinion and practice possible.

In tracing "The Development of our Knowledge of Anæsthesia," the subject of the toast, the speaker briefly alluded to the crude anæsthetic practices of the ancient, mediæval, and modern world, and commented upon the fact that although mandragora, hemp, opium, and hyoseyamus, the agents chiefly relied upon to produce anæsthetic effects in earlier times, were dangerous when given in full narcotic doses, still the stupefying effects of alcohol had been known to man from a remote antiquity, and might have been systematically employed for anæsthetic purposes as has been successfully done in our own day. Ether, too, had been known for five hundred years before its employment by Morton, and nitrous oxide gas for fully seventy years before its use by Wells.

With such agencies at command the speaker thought the long delay in securing the systematic practice of anæsthesia among the most puzzling problems presented to the student of human history, but said that while we might wonder at the slow development of anæsthesia in the past, future generations would possibly find equal cause for wonderment that we remain oblivious to truths and principles which, to them, will appear so simple and obvious.

That even now we are far from having any accurate conceptions of how or why anæsthetics anæsthetize, although, as far as the cruder mechanism of the processes is concerned, Bernard's theory of the partial coagulation of the protoplasmic constituents of nervous tissue is probably the true one.

Our knowledge concerning the progressive sequences of these effects upon the centres of intellection, co-ordination, movement, sensation, respiration, and circulation have not undergone any material modification since first described by Flourens in 1847.

As a result of the carefully conducted experiments of the Hyderabad Commission, the previously generally accepted view that chloroform is an agent having a specifically depressant power over the cardiac motor ganglia has undergone modifications, it having been conclusively shown that the fall in blood-pressure in chloroform narcosis is the result not of cardiac paralysis, but of capillary dilatation through the vaso-motor system. The speaker thought that a knowledge of this fact might tend to diminish the number of fatalities from the agent in question, as the more thoroughly the true effects of any drug are understood the more intelligently and effectively it can be employed.

Dr. Litch alluded to the discovery of the anæsthetic power of cocaine locally applied, and to the fact that even that agent was not entirely safe, as several fatalities and many cases in which dangerous symptoms have occurred are on record, and expressed the opinion that the ideal anæsthetic for prolonged operations yet remained to be discovered,—an agent perfectly safe, perfectly effective, and entirely convenient of administration.

The speaker thought that were it not for mechanical difficulties the mixture of nitrous oxide with free oxygen, as being both lethal and life-giving, would closely approximate the ideal sought for, and that a removal of these difficulties was quite among the possibilities of the future.

In conclusion, Dr. Litch called attention to the possible perversions of the use of anæsthetics and pain-obtunding agents in general, and expressed the opinion that the age is growing too timid in regard to pain and too clamorous for drugs which, at whatever cost, shall give immediate relief from even the slightest suffering.

"The Medico-Legal Aspect of Anæsthesia" was the topic given to District Attorney George S. Graham, Philadelphia.

This address was far above the average of such speeches. It abounded in wit and brilliant thought.

His description of a visit made to Dr. J. D. Thomas to have a tooth removed under anæsthesia was appreciated by the dental fraternity. "Now," he said, "I went there with the expectation that my demise was a very possible result;" and when the doctor said, "Now breathe gently, now a little harder," he thought of the before-mentioned possibility, and then suddenly he heard seraphic music and he felt so glad that, as he was surely dying, he was ascending instead of *going down*. He was brought out of this blissful contemplation by a rude shake and the doctor's call, "Wake

up!" And then he found that the angel-music proceeded from a music-box.

Rev. S. D. McConnell, rector of St. Stephen's Church, Philadelphia, spoke on "The Humanitarian Aspect of Anæsthesia." He expressed his great pleasure in being invited to talk on this subject, for he knew of nothing that he would prefer more to do than to honor this great discovery that had been such a blessing to humanity.

Dr. G. Q. Colton, of New York, then spoke briefly, giving some excellent advice, ending by quoting admirably a passage from Shakespeare.

Mr. Charles Wells, of Hartford, Conn., followed in a tribute to the work of his father. He mentioned that he was but five years old at the time his father was actively engaged in the work, but he retained very vivid recollections of some of the events of the time.

It was past the hour of midnight when the company very reluctantly departed.

It was the universal opinion that this day had been one of those epoch-making periods that come seldom in the history of professions and peoples, but when they do appear they mark a dividing line between the old and the new.

The only regret seemed to be felt that the entire dental profession could not have been made partakers in the glad reunion and in this memorial celebration.

There was a general sentiment expressed that a determined effort should be made to secure a fund sufficient to erect a monument in Washington.

Editorial.

THE FIFTIETH MEMORIAL CELEBRATION.

WHEN the proposition was originally made by Dr. J. D. Thomas, before the Odontological Society of Pennsylvania, that a celebration of the discovery of anæsthesia should be made, it was with no idea that it would extend beyond the confines of Philadelphia and would be, as intended, a local celebration by a local society. The mere announcement of the fact, or what we prefer to believe, a simulta-

neous impression, led to an immediate effort in various directions to celebrate this event in other localities. That this would deprive it of all educational value seemed clearly evident, and an effort was made, very properly, to nationalize it.

When the American Dental Association met last August at Old Point Comfort, Virginia, the question was brought up by Dr. Thomas, and, after due consideration, the matter was placed in the hands of a committee with power to act. The feeling throughout that large meeting was one of enthusiasm, the only drawback was the question, "Will the dentists of the country, or any considerable number of them, feel sufficient interest to make the journey to Hartford, Connecticut, in December, for no other place was regarded as appropriate for this celebration but the city where Wells lived and worked out this great problem. It was finally decided that the dental profession were in duty bound to celebrate the semi-centennial of the discovery of anæsthesia; that the time had arrived to proclaim to the world where, and by whom, this discovery was made.

There was no question raised as to the propriety of holding this, nor was there any contention as to place, as Hartford, Connecticut, was regarded as the one foreordained for it; but when the delegation from that city was consulted, it was found that they specially desired to have a local celebration of the event, and further, they were unanimously of the opinion that the national celebration should be held in some one of the large cities. The force of these arguments, coming from the city most interested, left no other course for the Association than to decide upon the city in which the celebration should be held, and without any dissenting voice Philadelphia was selected.

The committee, under the leadership of their energetic chairman Dr. J. D. Thomas, proceeded at once to perfect arrangements, and issued a circular, published in the November number of this journal and elsewhere, calling upon the profession to respond generously to this action of the American Dental Association.

The 11th of December, 1894, arrived, and with it came numbers to Philadelphia from fourteen States of the country, imbued with a spirit of professional pride, a gratifying proof of the deep interest felt in making this occasion an impressive one. For the details of this Memorial Celebration we must refer our readers to the report on another page.

It was one of those periods that come to the life of men, professions, and peoples when "New occasions teach new duties," and

we believe that the meeting performed, unexpectedly, an educational part in that it impressed all present with the fact that more than the discovery of anæsthesia, more than the honor due to Wells, more than a mere celebration of a great event in the history of the world, was the fact that this marked a dividing line between the older conception of duty and that broader and more generous idea of what should constitute professional life. It breathed into the souls of those present the finer thought that selfishness must be relegated to its proper level if the profession would develop the highest good.

The admirable addresses delivered in the afternoon struck the key-note of this idea. They properly eulogized Wells and his work, not forgetting Morton, Jackson, and the host of allied co-workers. The underlying conception seemed, however, to be that from this germ-thought of the man there arose a system of relief from pain, of benefit to the entire sentient life of the world, and that this glorified the century.

We have but one criticism to make, and it almost seems ungenerous to give it expression, yet the truth of history requires it. In the address of Professor Fillebrown the name of Simpson was given prominence as though he were the discoverer of chloroform. He was simply an active agent in promoting its use in his profession. For this he is entitled to great honor, but as Dr. B. W. Richardson expresses it (*Longman's Magazine*), "By one of those extraordinary frolics of fortune, never explainable, Simpson, seventh on the list of expositors of anæsthesia, leaped into the first place, and for almost a generation was believed to be the actual author of the process." The discovery of chloroform belongs to Guthrie, or, as Dr. Garretson properly places it, Guthrie, Liebig, Soubeiran, and in the order named.

The banquet of the evening was something more than a mere gastronomic performance. The men assembled were not there simply to eat and make merry, but all apparently felt the deep responsibility of the occasion. Fifty years was behind the world of surgery in the use of anæsthetics, and now had arrived the crucial hour, the closing of a half-century of experience in which the work was to be analyzed and the corner-stone of the monument to the honor of the discoverer was to be laid, and that so firmly that succeeding generations could point to this period without any misgivings and say truly, that to Wells belongs the honor of this discovery, and that to him the world is indebted for relief from the agony of the surgeon's knife.

The occasion was more than this. To the writer it seemed as though dentistry had received a new birth. The old was being cast aside, and in newness of spirit it had suddenly become a more glorified profession. It had passed through its day of trials, and now, on the soil dedicated to historic memories, it had cast off the old things, and, in harmony with the professions, its mission for the future was assured. Here theology, medicine, law, letters, and dentistry met on common ground, and over the grave of the great immortal was cemented a higher bond; and it only now remains for dentistry at large to absorb the lesson, hold it in reverential memory, and to practise its regenerated life.

Notes and Comments.¹

ERRATA.—On page 681 of the November number under the heading "Placing the Cap in Position," the word *coronæ* should have been printed *cornua*.

DR. J. AUSTIN DUNN, of 70 Dearborn Street, Chicago, has made a reduction in price of his valuable syringe from \$2.00 to \$1.50; with two platinum needles the charge will be \$2.00. This syringe is one of the best of its kind in the market, and has been improved by the use of a glass barrel, enabling the operator to keep it antiseptically clean with less difficulty than with other material.

THE NECESSITY OF TRAINING.—A recent writer in the *Outlook* very truly says that it is on the higher planes and in the last stretches of achievement that training becomes almost indispensable. Supreme excellence is the condition of supreme success, and supreme excellence is the result of very high training of some sort. It is for this reason that so many men and women achieve a credit-

¹ The assistant editor solicits contributions for this department,—new methods, new remedies and formulas, or any short practical note which may prove of value to the practitioner or student. Address 212 South Fifteenth Street, Philadelphia.

able success, and so few reach the great heights and seize the great prizes.

There are hosts of good lawyers, but the great jurists are few; there are many excellent physicians and dentists, but the distinguished men are far from numerous; there are multitudes of useful and self-sacrificing ministers, but thinkers and leaders in the pulpit are rare; there are many good writers, but those who make literature in any generation are a very small group. The first and more immediate success may be won by character, industry, and good ability; the second and ultimate success is conditioned upon an excellence which involves an exacting and long-continued training.

A PLEA FOR ENTHUSIASM.—At a meeting of the Missouri State Dental Association, Dr. A. H. Thompson presented a paper upon "The Duty of Young Men in the Dental Profession." There are few even now who lead, he said, and to whom the rank and file can look for inspiration and help. The Elijahs are being called away, and there are few Elishas to take up the mantles as they fall. We need men of genius, and to obtain them we must create environments and conditions favorable for their birth and development. This can only be done by general culture and a universal desire to advance beyond mediocrity. To this end the need of the times is enthusiasm, for, as has been well said, "the enthusiast must needs be honest, courageous, energetic,—and all these beget talent and ability." Therefore, cultivate enthusiasm, for that alone will lead to the awakening that will reveal to the soul its duty and its work.

DENTISTRY AND CORSETS.—One of the most successful dental surgeons in New York delicately suggests to his nervous patients, when there is nerve-rasping work to be done, that the easiest fitting garments that can be worn will increase the powers of endurance. Some of the baneful things he has to contend with in the operating-chair are new shoes, tight sleeves, high to choking collars, and, worst of all, corsets so tight-fitting that the patient, depending on high chest breathing, is in danger of suffocation when the rubber dam goes on to protect the excavated tooth preparatory to filling.—*N. Y. World.*

ANTISEPSIS IN DENTISTRY.—Dr. Shrady, editor of the *Medical Record*, every once in a while indulges in a "fling" at dentists and

dentistry. His latest is an accusation as undeserved as usual, as at one sweep he accuses the profession of neglecting antiseptics. To one who reads dental literature and attends association meetings of late years it is surely known that the average dentist pays more attention to cleanliness of instruments and of persons than does the average physician. That surely is our own personal experience. If the egotistical editor of the *Medical Record* had taken pains to find the facts, we believe he would have arrived at the same conclusion.—*Western Dental Journal*.

Current News.

CONNECTICUT VALLEY DENTAL SOCIETY.

At the Thirty-first Annual Meeting of the Connecticut Valley Dental Society, held at Springfield, Mass., October 25 and 26, the following officers were elected for the ensuing year:

President, Dr. C. C. Barker, Meriden, Conn.; First Vice-President, Dr. W. O. Barrett, Ware, Mass.; Second Vice-President, Dr. D. A. Jones, New Haven, Conn.; Secretary, Dr. George A. Maxfield, Holyoke, Mass.; Assistant Secretary, Dr. A. J. Cutting, Southington, Conn.; Treasurer, Dr. F. R. Rice, North Adams, Mass.

GEO. A. MAXFIELD, D.D.S.,
Secretary.

WOMAN'S DENTAL ASSOCIATION.

THE Woman's Dental Association met at Dr. Maria Lasser's office, 1602 Arch Street, Philadelphia, Pa., November 3, 1894.

Vice-President Dr. Elizabeth A. Davis in the chair.

Dr. J. Foster Flagg discussed Dr. Mascort's article, published in the *Dental Cosmos* for May, on "Salol in Filling Roots."

The next meeting will be held at Dr. Yerkes's office, 4004 Chestnut Street, December 1, 1894.

EMILY W. WYETH,
Recording Secretary.

RECENT PATENTS.

A LIST of recent patents reported for the INTERNATIONAL DENTAL JOURNAL:

523,049.—Adjustable Chair. Joseph R. Miller, Erie, Pa., assignor of one-half to J. R. Phillips, same place. Filed Feb. 24, 1893.

523,192.—Tooth-Regulator. Edward H. Angle, Minneapolis, Minn. Filed May 7, 1894.

523,472.—Method of Forming Tooth-Crowns. Jephtha G. Hollingsworth, Kansas City, Mo. Filed May 3, 1894.

524,419.—Dental Mouth-Mirror. Alfred E. Gray, Uxbridge, Mass. Filed June 1, 1894.

524,798.—Dental Vulcanizer. James H. Beebee, Rochester, assignor to the Buffalo Dental Manufacturing Company, Buffalo, N. Y. Filed May 4, 1894.

525,051.—Adjustable Chair. Charles H. Knight, Rondout, and Lemuel A. Chichester and David S. Relyea, Chichester, assignors to the National Chair Manufacturing Company, Chichester, N. Y. Filed June 14, 1893.

525,166.—Dental or Surgical Chair. Edmund P. Stiles, Austin, Tex. Filed June 3, 1891.

525,278.—Dental Tool-Guard. Arthur E. Peck, Minneapolis, Minn. Filed July 29, 1893.

Trade-Marks.—25,053.—Toothache Remedy. Harle, Haas & Co., Council Bluffs, Iowa. Filed February 25, 1893. Essential feature, the word "Magic."

THE International Dental Journal.

VOL. XVI.

FEBRUARY, 1895.

No. 2.

Original Communications.¹

AN ELECTRICAL DISINFECTANT.²

BY ALBERT E. WOOLF, NEW YORK.

GENTLEMEN,—I recall, just about this time, an epoch of my life when I was quite a boy. A number of us formed a little army and marched up to the Breevoort House, where Major Anderson was located, about the commencement of the war, and, making as much noise as we possibly could, called for Major Anderson. He came out and, after listening to an elaborate address, said, "Boys, I am a soldier, not a statesman, therefore you must excuse me for not making a speech to you. I thank you." Now, I may say, following the example of Major Anderson, if I am faulty in my delivery, I am an electrician and not an orator.

I am requested to appear before you to-night to give you an idea of what the electrical disinfectant is. I did not intend, before I came here, to go into details, neither did I intend to give the component parts of the disinfectant; but, coming in contact with a number of doctors who have been interested in the disinfectant and have experimented with it, I will trespass on your time a little and give you a slight history of the agent.

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the Central Dental Association of Northern New Jersey, at the meeting November 19, 1894.

Many years ago, in experimenting with the storage battery, I found that after the plates were thoroughly charged there was present more or less peroxide of hydrogen. I well knew the value of peroxide of hydrogen, as I was the first to introduce it, about eighteen years ago, in the bleaching of ostrich feathers. Knowing its value both as a bleaching agent and also as an antiseptic, and finding it in my overcharged storage battery, I proceeded to attempt to make it with electricity. My experiments with different materials finally led to a chloride of sodium solution. The intermediate steps in which I arrived at results will not be sufficiently interesting to you for me to dwell on details. After utilizing the chloride solution and getting very good results from that, and knowing the quantity of chloride of sodium in sea-water, I experimented with it, and found still better results, so much so that its action on organic matter of vegetable origin was almost immediate and destructive. I began to experiment on germs, and experiments were also made in the Carnegie Laboratory and in the laboratory of the New York Board of Health, and the destructive power of this electrical disinfectant on germs was pronounced to be most effective, with the advantage of being non-poisonous. We then made some comparative tests with bichloride of mercury, carbolic acid, and sulphurous acid, and we found finally that bichloride of mercury, carbolic acid, and sulphurous acid were not germ-destroyers, particularly in the case of spore-germs. These agents rendered the spore-germs temporarily inactive, but they afterwards came to life, while the action of the electrical disinfectant is to decompose them entirely. We have brought the materials for some little experiments, which we will show you later on.

Now, the action of the electrical current on sea-water is this: We find in sea-water chloride of sodium, chloride of magnesium, and chloride of potassium, together with some iodides and bromides, as well as, I claim, almost every element known to nature. In the decomposition of chloride of sodium, for example, passing the electric current through the solution, we liberate at the positive pole chlorine and oxygen; at the negative the base sodium would be deposited and the hydrogen would escape. Oxygen and chlorine enter into the composition of the base and form hypochlorite. The same will be the case with the magnesium and potassium. Therefore hypochlorite of sodium, hypochlorite of potassium, and hypochlorite of magnesium are obtained from the decomposition of sea-water.

The experiments that have been made by bacteriologists show

the destruction of germ-life by this electrical disinfectant to be rapid,—in fact, almost instantaneous,—while with the other so-called disinfectants it takes some time even to render the germs inactive. It has been a disputed question whether we have the formation of ozone in the decomposition of electrozone in presence of organic matter. The hypochlorites coming in contact with an organic body are split up; the chlorine, on account of its affinity for hydrogen, will seize on the hydrogen in the organic body, liberating therefrom one atom of oxygen. It will seize on the hydrogen of the moisture surrounding the organic body, liberating another atom of oxygen, and one atom is liberated from the hypochlorite. Thus there is liberated three atoms of nascent oxygen, which is ozone. Ozone is a powerful oxidizer, acknowledged to be as powerful as any ever discovered. I can only give you one illustration of its oxidizing action upon organic matter. It cannot be passed through a rubber tube without having an action on the rubber, while concentrated acids may be passed through the same rubber tube without having any action on it. Examining germs under the microscope, and bringing them in contact with the electrical disinfectant, we find motion ceases instantly. The reason of that is that the organic matter has been deprived of one of its elements. Then comes the oxidizing action, and under the microscope you will see the disintegration of the germ and the destruction of what has been heretofore germ-life. There is no disinfectant that I am aware of that will have that action on germs. The action of most disinfectants used heretofore is that of coagulation, thereby rendering the germs inert, but allowing them to remain in the same form as before, their shape not being changed; but if you take an elongated germ and treat it with the electrical disinfectant, it becomes in a short space of time contracted to almost a circular shape. All germs subjected to the action of the electrical disinfectant are contracted on account of the hydrogen being deprived of one element. While this has been accomplished with this disinfectant,—and the evidence that it has been accomplished is on the record,—then you will arrive at the conclusion that you can accomplish similar results in your particular specialties.

The first work that was done by the electrical disinfectant on a large scale was the treatment of the sewage of the town of Brewsters, New York. There the sewage, emptied on a marshy flat and being acted upon by the sun, caused a great amount of sickness; diphtheria, typhoid fever, typhoid malaria, scarlet fever, and kindred diseases were prevalent. The school-houses and public

buildings were closed, and the peculiar situation and the mortality caused the authorities of New York to investigate in order to arrest the spread of disease. They found that the sewage of the town of Brewsters was contaminating the drinking-water of the city of New York by emptying into the Croton. The experiment which I had made before the Board of Health with this disinfectant induced them to consult me in the matter. I said I would construct a plant for treating the sewage of the town of Brewsters so as to render it perfectly innocuous. We constructed a plant there and treated the sewage. The effluent was afterwards tested by Dr. E. W. Martin, of the New York Board of Health; Dr. Dunham, of the Carnegie Laboratory; Drs. Berry and Beebe, and they found that the effluent was perfectly sterilized; in other words, the sewage of the town of Brewsters had been so treated that the effluent which ran into the drinking-water of the city of New York was perfectly free from contamination. A test was made of the sewage with iodide of potassium paper, which was turned black, showing a surplus of gases over what were needed to sterilize it. We also treated the Croton water last year when it was in bad condition, showing nitrates and decomposed matter. We treated from seventy-five millions to eighty-five millions of gallons a day, and the water was proved to be, after treatment, free from foul and noxious gases.

Then the city of New York had deposited during the winter months a lot of garbage in a place called Riker's Island, which was bought by the city for this purpose. When the warm weather came fermentation set in, and there was a possibility of the formation of gases at that point sufficient to cause an upheaval. You couldn't go within four miles of Riker's Island when the wind blew from that direction without getting the odor of this fermenting garbage. We constructed a plant on the island for the purification of this mass of garbage, and to-day Riker's Island is free from odors or smells of any description, the decomposed matter deposited there is perfectly free from smell, and the large amount of sulphuretted hydrogen that was formed from the decomposing matter has all departed.

Thinking that a good many of you would be interested in this advance of science, I have brought here with me a box of garbage from Riker's Island, which I will pass around for your inspection. You will notice that it has a musty, mouldy smell, which does not appear in the presence of organic matter. The moment that musty, mouldy smell appears, you may know there is no organic

matter present. Before we treated this garbage at Riker's Island you could put an egg down a few inches in any part of it and cook it by the heat that was generated from fermentation.

Now, if we can take putrid water—poisoned sewage—and render it innocuous; if we can take decomposed garbage and render it free from its offensive odors; if we can put that treated garbage under the microscope and show you that it is perfectly free from organic matter of all kinds; if we can take putrid meat in an advanced stage of decomposition and make it sweet; if we can instantly kill germs of all kinds wherever we find them, then we reach the point where you will understand that this disinfectant can be used in the treatment of the human tooth. There is not a particle of doubt in my mind that the destruction of teeth is due to the action of germ-life. As to what the form of germ-life is I plead ignorance; what the manner of attack on the teeth is I do not know; but that decay of the human teeth does emanate from germs there is not a particle of doubt. Let us see what, for instance, the action of toothache is. The enamel is attacked; the germ reaches the interior of the tooth, through its decay, and attacks the pulp. That it is a germ attacking the pulp of the tooth which causes toothache there is no doubt, because the application of specially prepared electrozone—I don't care how severe or intense the toothache is—will cure it. The moment it reaches through the hollow of the tooth to where the germ is, the pain ceases, which proves that the disinfectant has attacked the germs and they have ceased to irritate the pulp. That is my theory, and I think I am right.

By some little experiments that we will try later, you will see what the action of this disinfectant would be in cleansing teeth. If, before you fill a tooth, you wash it out with the disinfectant, also carefully washing the instruments to be used, and being sure that your hands are free from germs and animalculæ, you may fill the tooth successfully, without fear of a recurrence of the trouble. I have been informed that there are some here who have had experience with this disinfectant, and when I get through they will relate what their experience has been. Of all the disinfectants that you have been called upon in your practice to use, I do not know of any that you would put in the mouth of a patient without the feeling, every time you use it, that it will have some injurious effect and is objectionable in some shape or form; but one peculiarity of the electrical disinfectant is that it is perfectly harmless; it is non-poisonous.

[The speaker here took a generous drink of his disinfectant.]

As much as that [referring to what was drunk] of any other disinfectant that you know of would be injurious to very many human beings if taken internally, but here is one that you need have no fear of putting into the mouths of your patients. There are many liquids that people get into the habit of drinking, but you can rest assured that your patients will never get a liking for liquor in this shape. Now, in using this electrozone in dentistry, if you have any patients that you are particularly fond of, I think if you recommend to them the washing of the mouth with this disinfectant, night and morning, you will find that it will kill all germs that reach the teeth and prevent their attacks; in other words, if a child will use this disinfectant for cleansing the mouth, it will prevent decaying of the teeth.

I think that we will find out eventually what this disinfectant is and the uses to which it may be put. It may be manufactured on a large scale for flushing the streets and sewers of large cities, and for similar purposes. It can be made for such purposes at a remarkably low figure, to be used in large quantities. At Riker's Island we used ninety-four thousand gallons every day. I have sent to Dr. Brown some which was specially prepared for dental uses, and I do not want those here to assume that the disinfectant manufactured on a large scale for sterilizing garbage and similar uses is the same as that prepared for medicinal purposes. It is a different material altogether.

In the absence of the opportunity of showing you the action of this disinfectant upon germs, I have here a little illustration of its value as a destroyer of organic matter. The scientists to-day claim that all germs have their origin in decayed vegetation. It is a well-known fact that aniline dyes have their origin in the chemical changes of vegetation. Vegetable matter subjected to nature's action in the earth is converted into carbon, from carbon we get coal-oil, and from coal oil we make the aniline dyes. As we cannot show you the germs, we may make a test with coloring matter, the coloring matter being organic matter of vegetable origin, as the germs are organic matter of vegetable origin.

[The speaker here filled three glass tubes with colored liquid, and added to them respectively carbolic acid, sulphurous acid, and bichloride of mercury].

You see the action of carbolic acid, sulphurous acid, and bichloride of mercury. (I will say that these chemicals that I am using here are not my own, but were kindly furnished by the Associa-

tion.) We will now take but one drop of the electrical disinfectant. You notice a white cloud appearing in that glass. A little agitation will decompose the organic matter; it is not the agitation alone that did the work. I showed this test several times in New York, and at first it was disputed by some scientists; they held that it merely decolorized the water. I told them I did not know whether it only decolorized the water or bleached the water, but the organic matter in it was decomposed and gone. The scientists will tell you to-day that all germ-creation is of albuminous growth. If that be a fact, and it is not disputed, then by experimenting with the white of an egg, which is pure albumen, we may see what the action would be upon germ-life. We will make some experiments in that way, which will give you an idea of how we can act upon germs, always bearing in mind the fact that germs are very minute, and that ten thousand cholera germs, placed side by side, would go through the eye of a needle; so, from the amount of albumen we are using here, you can form some idea of the many millions of colonies of germs that we are attacking. I have in this glass some pieces of broken glass. The object of it is to cut the albumen so that instead of one large globule of albumen we have to act on many little particles. [The speaker here broke an ancient egg.] Your President will be kind enough to tell you the condition of this egg. I will now put into it a few drops of the disinfectant. Your President will tell you the condition of the egg now.

President Moore.—It is a little more like Coney Island now.

Mr. Woolf.—Here we have some albumen which represents many colonies of germs. You notice that when I put bichloride of mercury, carbolic acid, or sulphurous acid in there, there is a coagulation of the outside of the mass of albumen. No matter how finely divided the albumen is in the tube, if you place a small particle of it under the microscope you will detect the presence of pure albumen inside and a coagulated coating on the outside. These so-called disinfectants form a coagulated coating on the outside, leaving the inside untouched. In like manner is the action on spore germs; the germ is rendered temporarily inert, but upon the disintegration of the coagulated coating on the outside the germ comes back to life again. Here are four tubes; I place in them sulphurous acid, carbolic acid, bichloride of mercury, electrical disinfectant. Now you notice coagulation here and coagulation there. You notice gas-bubbles commencing to rise here, which indicate disintegration of the albumen. Here you notice the albumen in coagulated form, and the same with the other two so-called disin-

fectants. There is no disputing the fact that the action of the disinfectant on germ life would be the same. If you noticed closely, you observed that before decomposition the liquid was pure white. It is rapidly turning yellow; the albumen is splitting up and is becoming part of the liquid; in a little while there will be no albumen there. When I turn this tube upside down some part of the albumen will remain in suspension, turning into gases without settling.

If it is at all interesting to those present, I would like to state that electrozone has proved a cure for tuberculosis of the rectum,—an affection where the tubercular germs enter the rectum and cause incessant diarrhœa. I have found that after two or three injections of this disinfectant the tubercular germ is killed and the diarrhœa is cured.

I believe it has been a problem that has caused a deal of anxiety to the medical profession to effect a cure where the cornea of the eye has commenced to slough. It usually results in the removal of one eye in order to save the other. Dr. Keyser, of Philadelphia, has used the electrical disinfectant in cases of sloughing cornea that he has treated, and in every instance a rapid cure followed. The doctor used it in a diluted form.

Dr. Roberts, of New York, had a patient suffering with a carbuncle, which commenced to slough, and blood-poisoning set in. He treated it by applying the electrical disinfectant on a cloth to the carbuncle, and in forty-eight hours the fever had broken.

These are a few of several cases that have been reported to me in which the electrical disinfectant has been tried at my request. I have received two letters within the last three weeks from patients treated for typhoid fever. It is reported to me that one patient who was being treated for typhoid fever was at death's door; they administered internally one part of the disinfectant to thirty parts of water, giving liberal injections also, and the patient recovered by reason of this treatment. In cases of diphtheria treated at North Brothers Island, New York, they have had better results from the use of the disinfectant than they have had from the use of the other medicines, and now the electrical disinfectant is used in almost all cases of diphtheria there.

I would also state that while the results of the treatment of cancer are at present, in my opinion, problematical, still, we have positively treated two, possibly three, cases of cancer, and one of them is reported as entirely cured.

I am sorry that Dr. Wallace is not here to-night, because he has

had some experience in this connection with a case of cancer. There are many other cases in which the electrical disinfectant has been tried with excellent results.

While you have seen me drink this disinfectant, none of you are aware of its properties and the large volume of gases contained in it. To make the thing perfectly plain, I will decompose some with sulphuric acid. The action of the acid will be to split up the hypochlorites and liberate the gases. That sulphuric acid plays no part in the liberation of the fumes without the disinfectant I will show you by first placing some in water. I have here some ammonia to show the amount of chlorine liberated; I will put the fume of ammonia around it. First, I will show you that the ammonia in itself plays no perceptible part.

I will take some disinfectant now and I will split up the disinfectant with sulphuric acid; that will give you an idea of why it is so potent—the amount of gases it contains—to do the work which it is reputed to do.

Now, if we have here a non-poisonous disinfectant, one that can be used without fear of injury, that you can apply to an ulcer with assurance that the discharge will be stopped, that you can use in the mouth, or as an injection, without doing harm, we have what you have all been looking for. I say, if you have here a perfectly harmless material, you are justified in experimenting with it on the suffering, and I think you will find that after you have experimented with it you will be highly edified. As to its application in cases of eczema, I will say that, while we have failed in some cases, we have received enough encouragement, certainly, to warrant a continuation of experimentation in that direction.

I am told that there are some doctors here from Philadelphia. The head of the Home for Consumptives in that city, Dr. J. Solis Cohen, has tried the electrical disinfectant at the Home for Consumptives, and he reports that the "ward in which he used the electrozone is much sweeter than the other wards, although all would be considered sweet until the one in question is entered." He reports that among the patients where he has used the electrozone expectoration has diminished in a marked degree. He hopes, after further experimentation, to report some further good results. My personal opinion is that if, instead of dividing the disinfectant into atoms by means of an atomizer, it were vaporized finely, so that it would be more easily drawn into the ramifications of the tubes entering the lungs, there would be a good chance of beneficial results.

I have recited these few cases to you in order that you may ben-

effit from my experience, and positively with no other object; for I feel that if I should in any manner be instrumental in easing pains and sufferings, then possibly I would have added my little modicum of plaster to the statue of science, which will not have been completed when time shall cease to be.

If any of you gentlemen have the inclination to ask questions, I am at your disposal to answer any that you may wish to put to me. I have a microscope here, and have brought some germs also, and we will put the germs under the microscope for your inspection and edification.

SULPHURIC ACID AND PEROXIDE OF SODIUM IN THE TREATMENT OF PULPLESS TEETH.

BY F. T. VAN WOERT, M.D.S., BROOKLYN, N. Y.

THE object of this short paper is to explain somewhat the details necessary for the accomplishment of results such as I have attributed to the above named drugs; and in the beginning be it understood that there is nothing to follow which is original with me. The credit, if any, is due to the gentlemen whose names appear in this paper as having introduced these remedies to the profession. Since the introduction of sodium peroxide by Dr. E. C. Kirk, three years ago, I have met with very great success in its use, as well as in making the solution. I seem to have been more fortunate than many others, as I am constantly in receipt of communications stating that the writers have failed utterly in their efforts to accomplish results like those claimed for the remedy. The sulphuric acid which was recommended by Dr. Callahan at Asbury Park, last August, I have found so valuable in bringing to light nerve-canals that would never be found were it not for its use, that I embrace this opportunity to spread the glad tidings, with the hope that others may be profited by it as I have. It is generally conceded that one of the most difficult and uncertain operations which we are called upon to perform is that of opening and sterilizing roots, and in a great many cases it is utterly impossible to accomplish that end, and the result is the loss of many valuable teeth. Dr. Shields, of New York, claims that this is due to a lack of professional education and manipulation, and makes the absurd statement that he always opens to the end and fills all roots, which you know as well as I do is a mechanical impossibility. It is eighteen hun-

dred and ninety-four years since any one man has claimed such perfection, and I predict it will be as many more before another member of our profession will have the audacity to proclaim himself absolutely perfect, and the rest of us diabolical quacks. My excuse for these utterances will be found on pages 12 to 15 in the *Transactions of the New Jersey State Dental Society*, 1893.

Dr. Callahan recommends a forty- to fifty-per-cent. aqueous solution, as follows: "Let us suppose we have an inferior molar tooth in which the pulp has been destroyed; we adjust the rubber dam, open the pulp-chamber thoroughly, take an old discarded broach, twist a little cotton on the end, bend the broach to a right angle so it will reach well down into the cavity, place the broach into a suitable handle, and by means of the broach and cotton place directly upon and above the dead pulp a drop or two of a forty- to fifty-per-cent. aqueous solution of sulphuric acid. The solution, by a process of dehydration, will cause the pulp to shrink and toughen so that it can with comparative ease be removed. Now, by means of the broach and cotton, place a drop of the solution over the entrance of each canal. Sometimes it will be necessary to sink a little well or depression at the mouth of the canal, to get the acid to stay where it is wanted, being careful to use only round or bud-drills for this purpose.

"Take a No. 5 Donaldson nerve-canal cleaner, bend it to a suitable angle, cut the shank short with nippers so the broach will fit up close to the handle and be rigid and strong; then with a pumping motion begin to enter the canal slowly and carefully. The acid will precede or follow closely the fine broach and destroy all septic matter it comes in contact with. Proceed until the patient notifies you of a sensation which is similar to that felt when chloro-percha goes through the foramen; treat all of the canals in the same manner. I say all, because sometimes you will find what appears to be four distinct canals.

"Usually three canals will be found. The posterior root will have one broad canal; the anterior root will nearly always show what seems to be two canals.

"By this time the solution will be so charged with disintegrated tooth- and pulp-substance that it will hide the canals from view. Now, by means of a Dunn syringe, fill the cavity with a saturated solution of bicarbonate of soda; this, when brought in contact with the acid solution, liberates carbonic acid gas in such quantities that the effervescence will carry all the broken-up tooth- and pulp-substance out of the canal, out of the tooth onto the rubber dam,

leaving a deposit of bicarbonate of soda lining the whole tooth. This can be removed, if desired, by a little sterilized water, alcohol, or peroxide, either of which will leave the canals white and clean.

"If we desire to make the canals larger, place more acid in them and use a larger broach until the canal is as large as wanted; then cleanse again with bicarbonate of soda; dry the canals thoroughly by means of paper points, alcohol, hot air, etc., and you have the cavity and all the canals thoroughly opened, thoroughly clean, thoroughly aseptic, and you can proceed to treat or fill, as you may choose."

I have been using this preparation as described in the above quotation, and find the claims made by Dr. Callahan for it precisely as he has stated, to wit,—

1. The operation is perfectly safe, because the action of the acid is self-limiting on dentine.

2. It is a pronounced germicide.

3. The acid acts upon diseased tissue with far greater vigor than healthy.

4. The destroying of the diseased tissue in this way leaves a fresh aseptic surface.

5. An aseptic wound will heal itself in any part of the body if properly closed.

6. Dr. Callahan claims that the acid softens the dentine a very short distance.

In the use of a bicarbonate of soda solution the acid is neutralized, in doing which carbonic acid gas is generated in sufficient quantities to carry off the *débris* from the root-canals.

Now, do not understand either Dr. Callahan or myself as claiming the use of sulphuric acid and soda bicarbonate solutions to make it possible to open all root-canals, but credit us with the conviction that by its use many hopeless cases are mastered and hundreds of teeth saved which would otherwise be lost.

When you are not successful in your attempts to thoroughly cleanse the canals, place in the pulp-chamber a saturated solution of sodium peroxide and seal the crown from twenty-four to forty-eight hours; then remove and wash with warm water, after which fill in the usual manner, with the assurance that the majority of cases will not give you further trouble. But to obtain these results it is absolutely necessary that every detail is followed in the making of the solution.

First, the peroxide must be powdered in a mortar, as it is not

fine enough as purchased to add to the water without a chance of spoiling the solution before its completion.

Dr. Kirk explains the cause of this on page 499 of the *Dental Cosmos*, June, 1894, as follows: "If the solution be made hurriedly by the addition of considerable quantities of the powder to the water at one time, the evolution of heat due to the energy which attends the combination produces a rapid elevation of the temperature of the solution.

"This causes a decomposition of the peroxide, a loss of its loosely combined extra atom of oxygen occurs, and the resulting solution is little more than a solution of sodium hydrate, or ordinary caustic soda, which is practically inert as far as bleaching power is concerned.

"To obviate the rise of temperature and consequent decomposition of the peroxide, the solution must be made slowly."

To make this solution, take a common tumbler about half full of distilled water, place it in the centre of a good-sized pudding-dish, and pour all the cold water around it possible without floating the glass. Add the sodium peroxide in very small portions, about what could be taken upon the point of the large blade of a pocket-knife, dusting it in the water slowly to cause as little agitation as possible, and this amount should not be added oftener than once in a half-hour, being careful to have the sodium peroxide finely powdered; this to be continued until the preparation begins to look opaque as powder is added. Let it stand over night, and it is then ready for use. This takes several days to make, but it will more than pay for the time consumed in its prompt action as a bleacher and sterilizer.

The general impression is that sodium peroxide is for bleaching only, while it is the most valuable preparation I have ever found for the treatment of dead teeth, if used as described before.

The question has been raised as to whether this solution does not disintegrate tooth-substance. I feel safe in saying that it does not, having used it very extensively the last three years without once giving trouble. The preparation can be kept in a glass-stoppered bottle for a long time. It is just as well to keep it in a cool place.

To preserve the powder, screw the top of the can down tight, and run between it and the outer rim a little base wax melted so that it will barely pour. You can remove the top at any time by simply passing the point of a knife through the wax, close to and around the same.

I sincerely hope I have made myself plain in this matter, and that those who read this article will try for the results claimed, as I am sure they will find the addition to their medicament cases very valuable. I am just in receipt of a communication which reports very successful results in the use of peroxide of sodium by a student in the Philadelphia College, after the following method: Apply the dam, cleanse and prepare the cavity, place in the pulp-chamber a small portion of the powdered peroxide, then flood the cavity with water, allowing it to remain until the agitation from the combination ceases, after which it is washed out and treated as before described. This would seem to me a very practical and sure way of obtaining a solution that would be effectual.

NOTE ON HYDROGEN DIOXIDE AS FURNISHED TO PRACTISING DENTISTS.¹

BY HENRY LEFFMANN, M.D., D.D.S.²

HYDROGEN DIOXIDE was for a long while a chemical curiosity, known only to a few special workers. I remember how, as a beginner in chemistry, I read with interest in one of the larger manuals the descriptions of the ingenious but tedious process by which Thénard prepared the substance, and also how much interest was awakened by its curious and exceptional properties.

Although we are still but little familiar with the pure substance, the dilute solution is now so well known that we are able to study all its important properties and utilize its valuable actions.

For several years I have kept a desultory analytical watch on the commercial solutions of hydrogen dioxide. I published in the *Medical News* over two years ago a short paper in association with Dr. William Beam, giving assays of the samples of the brands commonly sold. The examination was suggested to me by the editor of the *News*, and grew out of a paper by Dr. Wallian. In the examination a process of assay was used which had been devised by Mr. Marchand, generally accepted, and considered reliable. Dr. Squibb,

¹ Read before the Odontological Society of Pennsylvania, November 10, 1894.

² Professor of Chemistry and Metallurgy in the Pennsylvania College of Dental Surgery.

however, who at one time used and advised the method, has since shown that it exaggerates the amount of available oxygen. Nearly two years after this paper was published, one of the firms from which samples had been obtained wrote me a long letter objecting to the results. I thought that it would be a good time to reinvestigate the matter, and accordingly published in the *Medical News* the results of a much more extended series of assay, covering twenty-one samples and including various tests.

The members of this Society are, I think, mostly familiar with this paper, and I need not refer to it further than to say that it showed that while there are several excellent brands in the market, there are also many poor ones. The reputation of a house is no guarantee, nor is the price. Two samples from Merck's contained almost no dioxide. A sample which claimed as a special merit the small amount of fixed solids showed the highest in the list. Recently my attention has been called to an English brand much in favor with some physicians. I obtained a fresh sample (four-ounce bottle, retailing at one dollar), and found it to be of poor quality.

At the time the investigation of the twenty-one samples was made I had several prescriptions calling for one ounce of hydrogen dioxide put up in different parts of the city, and I also obtained samples from several of the dental depots. I was so struck by the inferiority of the latter set that I thought it well to bring the matter before this Society, but owing to my not communicating my desire to the Secretary soon enough, it could not be placed on the programme until after the article had appeared. Although a mere mention of the results in the direction was made in the *News*, I preferred to wait until a later period before reading a paper. When, therefore, I was asked by Dr. Faught to contribute something for this meeting, I suggested this topic. I have added a few facts this week, which show that there is still room for improvement.

Hydrogen dioxide solution should be a clear fluid, containing sufficient amount of the dioxide to give ten volumes of oxygen when completely decomposed. Fifty cubic centimetres of it should not require more than about five cubic centimetres of decinormal sodium hydroxide to neutralize the acid present. It should keep well in a moderately cool atmosphere. On opening a fresh sample no distinct explosion should occur, and when poured into a beaker very little effervescence should be noted.

The assay for volume strength is made by means of a solution of potassium permanganate. I need not describe it here.

I give the following figures as to hydrogen dioxide solution sold to dentists.

TESTS ABOUT FEBRUARY 16, 1894.

	Volumes.
Prescription from A. Robbins's drug-store, Eleventh and Race Streets	10.9
Prescription from drug-store at Frankford and Girard Avenues	10.9
One-ounce bottle, S. S. White Dental Manufacturing Company	5.1
One-ounce bottle, S. S. White Dental Manufacturing Company, second sample	5.4
One-ounce bottle, G. Sibley	0.5
One-ounce bottle, H. D. Justi	1.4

RECENT TESTS.

	Volumes.
One-ounce bottle, S. S. White Dental Company, first sample, November 10	5.04
One-ounce bottle, S. S. White Dental Company, second sample, October 30	5.3
One-ounce bottle, H. D. Justi, first sample, November 1056
One-ounce bottle, H. D. Justi, second sample, November 1056
Sample of Marchand's purchased at G. Sibley's, October 30	12.04
Samples of McKesson & Robbins's hydrozone, at least six months old, kept in photographic dark room, and opened to-day, November 10, no internal pressure, contains	9.1
Samples of McKesson & Robbins's pyrozone that has been standing in laboratory for at least six months, opened occasionally, showed	9.1
Pyrozone, when fresh, contains almost exactly	10.

I have tested also the acidity of the small samples noted above. They show a rather high acidity in some cases, but as the quantity available for test was small, it is hardly just to institute comparisons.

The above samples were all in original packages, and were tested when fresh. The one-ounce bottles cost fifteen cents,—a very high price even for a good article. Pyrozone, which is most expensive, ten-volume solution, in this market sells for fifty cents for four ounces, but the above samples are sold at the rate of sixty cents for four ounces. A ten-volume solution of excellent keeping quality is made by the Oakland Chemical Company, and may be obtained at retail at about sixty cents a pint. Such a solution will keep in an office for weeks without appreciable loss if a little care be taken not to place it in a warm corner.

There is no necessity for buying the material in one-ounce bottles, and there is also no reason that the large supply-houses should retail such inferior samples as above noted. Approximate assays are easily made at such establishments. A solution of potassium permanganate will last a long while, and but one cubic centimetre

of a given sample of hydrogen dioxide is required for the test. Even, however, if this be thought too much trouble for the dealer, he can purchase guaranteed articles and retail them.

THE CORRECTION OF INJURY RESULTING FROM EXTRACTION.¹

BY S. E. DAVENPORT, D.D.S., M.D.S.

WHILE this is not intended specially as a plea for conservative practice, it serves as a fitting opportunity for the condemnation of inflexible rules governing either the choice of filling-materials or methods for the correction of irregularities, instead of basing the decision in every case upon existing circumstances and conditions.

The writer will never forget the horror with which he heard a prominent dentist give as his advice for the correction of three overeroded mouths, the casts being before him and differing much in typical characteristics, that the sixth-year molars in all three cases should be extracted, adding that he saw but few crowded arches which similar treatment would not correct.

That was at least ten years ago, long before Dr. I. B. Davenport's comprehensive explanation of the ideal and warning to all practitioners against a disturbance of the same, which studious essay has, in the writer's opinion, done as much to establish the habit of original thinking and of saving teeth from the forceps as any paper of recent years.

Any single illustration of harm resulting from the extraction of sixth-year molars will not, as is well understood, serve to condemn the method in its entirety, but as the case which is to be presented this evening received the combined advice of four well-known dentists, three of whom are members of the New York Odontological Society, it will at least prove that the conditions which seemed to those gentlemen a proper basis for such advice were not principles, but prejudices.

In 1882 the patient, then a resident of Brooklyn, a boy of thirteen years, was taken by his parents to their dentist, who advised the extraction of the sixth-year molars, hoping thereby to correct a slight prominence of the lower incisors, and what seemed to be a

¹ Read before the New York Odontological Society, October 16, 1894.

too crowded condition of the teeth, both upper and lower. He was encouraged, perhaps, to give the opinion by the presence of compound cavities, anterior-proximal and crown, in the lower molars.

The parents were not pleased with the advice, and, during the following eighteen months, consulted two other Brooklyn dentists, and, finally, at the suggestion of their family dentist, brought the boy to New York, to get the advice of one of his prominent friends here.

As above stated, all four dentists agreed, and late in 1883, when the youth was fourteen years old, the four teeth in question were removed.

Fortunately for the evidence the teeth were preserved, and have since been seen by the writer, the upper ones having only small crown cavities, and while the decay in the lower teeth was extensive, there is no question but that any one of the four gentlemen could have so filled them that the teeth would have been preserved a lifetime.

The decay in all four teeth must certainly have been much less when their extraction was first advised than it was eighteen months later, when they were removed, and the force, therefore, of existing decay as a corroborative reason for such advice was much less at the earlier period, and was entirely insufficient even at the time of extraction.

When the patient came into the writer's hands five years later, almost the first question the mother asked was, "Why is it that my boy will persist in masticating almost entirely with his front teeth, in spite of my calling his attention to so bad a habit almost every day?"

The boy had actually no points of contact other than the occlusion of the wisdom-teeth and of the central and lateral incisors.

It may be interesting also to state that about this time the youth was suffering from so-called nervous dyspepsia, and was receiving treatment for it at the hands of a well-known specialist.

At this point of the story it seems fitting to appeal to all who have the advancement of their profession at heart not to advise the extraction of teeth for the purpose of regulation without first taking casts, so that the relations existing between the lingual and palatal surfaces of the teeth may be observed.

Frequently this occlusion of the inner surfaces has an important bearing upon the opinion formed and the advice given, and the casts serve as a most important basis for the intelligent study later, when the results of such extraction are accomplished.

Children are sometimes counselled by their elders to count twenty when tempted to make an angry retort, expecting in that way to cause one to modify his answer; and as, in the opinion of the writer, by far too many teeth are still sacrificed with the fallacious idea that room which can be utilized is being gained, the rule to always take casts and study them before advising extraction would not only serve to teach the dentist many principles, but through his greater knowledge of nature's laws would cause him to be less frequently a murderer of the dental organs.

As the wisdom-teeth were fully erupted when the writer first saw this young gentleman, there was no hope that either growth or development would ever cause such occlusion of the bicuspid and twelfth-year molars as would enable him to properly masticate.

After expanding the upper arch slightly in the twelfth-year molar and second bicuspid region for the purpose of bringing about a better relation between the upper and lower teeth, it was decided to build up largely with gold the lower twelfth-year molars, and to build down the four upper bicuspid and the upper twelfth-year molars.

While it was not possible to give an ideal masticating surface according to Dr. I. B. Davenport's illustration of planes and angles, the result was so satisfactory that almost immediately the habit of masticating with the front teeth became a thing of the past, and the remedies administered by the noted specialist became so efficacious that the dyspepsia was cured.

At the time this case was accepted an effort was made to secure casts of the mouth as it was before the teeth were extracted, but none of the gentlemen whose advice was followed had taken casts, all having given their opinions condemning the four large teeth, after a hasty and necessarily superficial examination.

A glance at the method adopted for hinging the casts which are being passed around, so that the inner surfaces of the teeth can be studied when the jaws are closed, will explain the assertion made above, that any examination of the natural teeth alone must be, necessarily, too superficial to serve as a basis for the condemnation of teeth.

If any present are inclined to doubt that the loss of the sixth-year molars in this mouth was the cause of the deplorable condition afterwards found there, they are referred to the cast first shown, where the characteristic tipping of the teeth will, the writer thinks, prove his position to be correct.

Reports of Society Meetings.

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, October 16, 1894, at the New York Academy of Medicine, No. 17 West Forty-third Street, New York City.

The meeting was called to order by the President, Dr. Brockway, who welcomed the members after the summer vacation.

The Secretary read the minutes of the previous meeting, which were approved.

INCIDENTS OF OFFICE PRACTICE.

Dr. Jarvie.—About two years ago a lady called on me, complaining of severe pain in the right superior lateral. The tooth had never been filled, and was then free from decay, yet pain in it was frequent, and it was particularly sensitive to thermal changes. After treatment for some days and the pain not subsiding, I drilled into the palatine surface and applied creosote and arsenic to kill the pulp. After the removal of the pulp, and upon pumping carbolic acid into the canal, I noticed carbolic acid oozing out between the gum and the root upon the palatine surface. Close examination revealed absorption upon that side of the root reaching inward to the pulp. Further examination revealed a corresponding cavity of absorption upon the labial side of the root, reaching into the pulp-canal. The points of absorption were about one-quarter the length of the root beyond the gum margin. The tooth was treated and filled.

During the past summer the tooth was broken off, the fracture occurring at the point where absorption had taken place and where the strength of the tooth had necessarily become much impaired. I was away at the time, and as the broken part was still attached slightly to the gum, Dr. Turner, my associate, tied it in place to the adjoining teeth with waxed silk until my return.

This seemed a case for transplantation, as for many reasons it was undesirable for the lady to wear a plate. After failing to secure a suitable natural tooth, I got a lateral with badly-decayed crown, but with a good and suitably-shaped root. To this root I attached a porcelain crown that matched the natural one perfectly, but I

was perplexed for a time to know how to remove the portion of the root remaining in the jaw, which was firmly held in the socket. Any ordinary means would bruise the gum and possibly fracture the socket, and induce a condition of affairs fatal to a successful transplantation. I finally drilled through the centre of the root, almost to the end, following the canal, with a Gates-Glidden drill; cut a thread in this, and then inserted a screw firmly, pulling out the root by this means without injury to gum or process. I then inserted into the socket the root with artificial crown attached. This operation was performed ten days ago, with what ultimate success time alone can tell.

Dr. Lord.—I may say that in my experience in using gold and tin together I get better results from having the gold very largely in excess, and folding the two foils together; then, if I want at any time to make a filling so as to neutralize the color of the gold, I put about one-twentieth of tin with the gold, and it makes a very pretty color, and one that will not tarnish. It is very nice for the labial surface.

I may also say that Mr. Williams has recently brought out some tin-foil that is very much superior to any that I have ever used. I have said at our meetings that the tin that I procured from him some twenty-five years ago I thought was better than any that he had made since, or any that I had ever seen. He has overdone it this summer, however, and his tin is superior to that which I thought was as good as it could be. It works waxy, I might say; we can do anything with it, with suitable instruments. A very little of it put with soft gold makes the gold tougher. It requires much less anchorage, and you can build out or contour with it as much as you desire, if the cavity has three walls remaining.

Dr. Watkins.—Would you use very thin foil?

Dr. Lord.—The foil is thinner than that which I have used for many years, although it is not what we would call thin. That which I used previously was marked Number 4, but I think it was a heavy Number 4. This is Number 3. I said to Mr. Williams some time ago that I wished he would get out a thinner foil, and he did so; but it did not compare with the foil which he has now produced.

Dr. Perry.—Many years ago, when there was a craze in reference to the use of tin-foil at the cervical margin with gold covering it, I indulged in the practice for a few years, but I have not done so for a long time, for I found that the tin-foil in time dissolved. I also used the gold- and tin foil rolled together in different proportions,

but I do not do so now. With a good quality of soft gold, I fail to see the real advantage of combining tin with it.

In reference to the case which Dr. Jarvie has reported, I would like to ask him if the tooth itself could not have been placed on a suitable root, the advantage being that if it were a reasonably sound tooth a more natural appearance would be secured than by an artificial tooth. I have put artificial crowns on natural roots a great number of times, and with great satisfaction, because it is easy to secure the proper size and length of crown; but I always think an artificial tooth is not like a natural one in different lights,—in the evening, for instance.

In reference to getting rid of the root, Dr. Jarvie's method is a very ingenious one. Once when I had a root which I could not get out without fear of injury to the gum, I patiently and deliberately drilled the root all away. It was a very tiresome operation, and I should not like to do it again. It was done without pain to the patient.

The President.—Could you not have removed it with a screw?

Dr. Perry.—It was so far gone, and the opening through the root was in such a condition, that it seemed to me I could not get a secure enough foundation for the thread of the screw to warrant my doing so. This question, of course, brings up the subject of implantation. I recently had a young lady patient with a superior left second molar from which great trouble had arisen many times during the last two or three years, to the point of wearing out her patience and exhausting my own in the way of trying to keep the tooth filled. I finally said to her that I thought she had better have the tooth out. She went to Dr. Hasbrouck and had it extracted, and when she brought it to me, I found a large amount of abnormal tissue between the three roots, a condition which clearly explained the fact that no filling could be kept in the tooth for any length of time. I cleaned that abnormal thickening of the periosteum all off very nicely, filled the tooth to the extremities of the root, put it back for her, and secured it in place by drilling a little hole through the edge of a filling on the wisdom-tooth adjoining, and passing a thread through that, and carrying it across the end of the molar, and then tying it around the first molar to keep the tooth from slipping out at night. Yesterday I took off that thread, and now the tooth is seemingly as nice and comfortable as any other tooth in her mouth. The operation was performed a week ago last Thursday. She asked me what I could promise in reference to it. I said, "I will make no promises. It is worth the trial,

because the trial is made easily. It may become ankylosed. I have never implanted a tooth in that condition before, so I cannot say." It looks very favorable now, and is thoroughly comfortable. It was a little painful the first night, but nothing to compare with the pain before the tooth was extracted.

Dr. Watkins.—A few years ago there was considerable discussion on implantation, and there was a difference of opinion as to whether the periosteum should be removed or left when the tooth was implanted. Some removed it, others did not. Some went so far as to claim that the percentage of failures depended on whether the periosteum were perfect or imperfect. I would like to ask Dr. Jarvie and Dr. Perry what their experience has been in regard to that.

Dr. Jarvie.—I have not had so many cases of implantation as some others have had. I prefer always to use a root with the periosteum on it, and I take care not to disturb it if possible. I do not say it is necessary to have the periosteum intact, but I prefer to have it. In regard to the case which I related, I did think of using the natural crown of the tooth, but I was able to get a porcelain one that so closely resembled the natural one that I think it would be difficult for any one in the room to say which was the porcelain crown without the aid of a mouth-glass. As the porcelain would be stronger and sure to be free from decay in the future, I thought it wiser to use it. I had at first intended to take out the root in the way Dr. Perry mentioned, but the thought of the screw afterwards came to me, and it left a very clean, unbruised socket, which I considered very desirable.

Dr. Perry.—In reference to Dr. Watkins's question, I should be willing to venture this opinion: that it does not make much difference as to the presence of the periosteum. I thought in the early days that it was necessary to have it, but it is hard to find a tooth with the whole periosteum in good condition. I do not care so much whether it is on the tooth or not. After having made many trials, I have come to be more careful in reference to the age of the tooth implanted than the condition. I consider that young teeth are not so favorable for implantation as older ones. I think they become absorbed more readily. My view is that an old, hard tooth is more favorable for implantation.

Dr. Jarvie.—How about the fit in the socket?

Dr. Perry.—A good fit in the socket is valuable for the beginning, but I do not think it essential.

Dr. Jarvie.—I prefer not to have the tooth fit very tight into the

newly-made socket. I think the best success I have had is with a tooth I inserted about seven or eight years ago. A gentleman had a second superior bicuspid that was very loose from pyorrhœa. The attachment was almost entirely gone. I removed the tooth, and with a large bur cut away all affected bone and considerable of the soft parts, making a socket that was as large again as the root of the tooth that I put in. I placed the tooth in position and tied it with silk ligatures, which is the method I always employ, and I think that tooth is the firmest one in the gentleman's head to-day. That may not be saying much, as they are all rather shaky.

Dr. Watkins.—Are you particular to use a tooth which has been preserved in an antiseptic from the time it was extracted, or do you make use of any tooth which you find?

Dr. Perry.—I let them dry up, though I do not like to have them crack. I used to keep them in a bottle with a small, moistened sponge. Now I simply soak them in bichloride for a short while before I use them. I have had over a hundred cases of implantation; I do not think more than one-half of those cases are in to-day. But I think more than one-quarter of them are very handsome successes. How long they will be I do not know. Often when a tooth comes out I slip another one in. I have done this as many as four times in the same socket, ranging over a period of six or seven years.

Dr. Hodson.—I would like to ask Dr. Perry if he is not particular about there being any “bark” on the root,—what about the porcelain ones that we heard about a year or so ago?

Dr. Perry.—That has been tried and given up.

The President.—I see that Dr. Sailer has brought something for us to-night. I hope he will explain it to us.

Dr. Sailer.—It is the custom of the profession to-day, rather contrary to what was done some time ago, as I understand from the older members of the profession, if they think they have anything new, to present it for the benefit of their brethren. I have been using this instrument in a more or less perfect state for two years, and several of the gentlemen have seen it and desire me to present it to the Odontological Society. The first consideration for a dentist to adopt anything in his practice is, whether it adds to the perfection of the operation, the ease and comfort of the patient, and comfort and ease of the operator. I think this little thing, which I call a “combination box,” because it contains seven different things, adds to all three of these elements. This box is divided into two compartments on this side to hold water. There is a sterilizer, in

which the water can be kept at a temperature of from 180° to 212° . There is a compartment to be used in case you want an impression with modelling compound. You have it right at hand, and there is no delay. There is a little wire frame for holding the mirrors. It keeps them at a temperature which prevents the breath from condensing on them. There are two little compartments for gutta-percha. There is another compartment for gutta-percha which does not require such a high degree of heat. The gutta-percha can be kept there for days at a time without losing any of its qualities. There is a glass of water, which is held in place by springs at the side. It permits of the circulation of air around the glass. You can have the water in the box at 190° or 200° , while the water in the glass is at a much lower temperature. There is a depression here to hold the instruments for using gutta-percha. If you wish to introduce gutta-percha into a tooth to destroy a pulp, or where the pulp is nearly exposed, and you do not feel justified in covering that tooth with the oxide and phosphate, as we sometimes do, but want to wait for results, you can introduce gutta-percha into cajuput, and use the two materials together. You can introduce it at a warm temperature and it will be more effective. There is a little slab here to hold medicines for a sensitive tooth. I introduce them warm, and I get as a first result the soothing and warm effect, rather than the pain which comes from the use of a cold medicine. This box is placed beside my cabinet. In my office it is on a bracket, about six or eight inches long. It is always at my right hand, and always ready for use. I have found it a great convenience for the last two years.

Dr. D. W. Barker.—Your President has requested me to show you an improved method of disinfection of putrescent pulp-canals. The materials which have been introduced for that purpose within the last few years contain a surplus of oxygen, which, when brought in contact with any material which has a strong affinity for oxygen, as pus, for instance, causes the pus products immediately to change their nature. These materials, however, have some disadvantages. They are almost all extremely caustic. That objection applies to the strong sulphuric acid which is now much used. The materials which I prefer for that purpose are two very simple ones, and by their union in the pulp-canal they set free the nascent oxygen. They are permanganate of potash and peroxide of hydrogen. When brought in contact in the canal the effervescence is very violent. I will illustrate it in your presence. The best way to do it is to take a Donaldson bristle and dip it in the

powdered permanganate of potash, and then with a little syringe drop a little peroxide of hydrogen on it. [Dr. Barker illustrated the effect of the two materials on his hand.] It produces on the hand only a slight warmth. If the two are made in a solution the union is much more violent, amounting almost to an explosion, and the effect is much more noticeable. It does not stain the teeth. I have stained my hand because I did not use a sufficient quantity of the hydrogen to neutralize the potash. I have been using it for some little time. The teeth so treated show a remarkably quick cure. I have used this method, and after two or three applications the tooth fails to show the characteristic foaming when peroxide alone is introduced. I have attempted to close up and fill them in a week or ten days, just to see how quickly it could be done, and with very good success.

Dr. Hodson.—Does the formation of gas produce any irritation to the periosteum?

Dr. Barker.—In my experience, I have not met any such cases.

Dr. Hodson.—Are you particular to have it go to the end of the root?

Dr. Barker.—I have not exercised any precautions to prevent that. As soon as I have the peroxide on the powdered potash, I introduce a Donaldson bristle, and pump it up and out quickly.

Dr. Davenport then read a paper entitled "The Correction of Injury resulting from Extraction," after which the President called upon Dr. Bonwill, of Philadelphia.

(For Dr. Davenport's paper, see page 81.)

Dr. Bonwill.—I do not know how many may have read my article after it was published. I know of several gentlemen who did not read it; they were honest enough to confess that to me. I thought I was condensing the whole thing as much as possible, but I will recall the principal points, since so few have perused the essay as published.

[Dr. Bonwill then read a *résumé* of his paper.]

1. My "New Era" is not the "New Departure" in any way. It is adaptability, not compatibility.

2. The title is an assumption based on a practice from varied experience, precedents, and results.

3. I assume that the hour has arrived when we must adopt some practice that will more generally attain the ends for which every dentist in the land cries out. That there is a void in everything done by us that no system, now extant, can fill.

Our failures.—1. The majority of men who enter our ranks.

2. Even with good men failure is with us on every side. The journals and all essays and discussions attest it.

3. The materials.—When and where to be used, and how to manipulate gold, amalgam, tin, oxyphosphate, gutta-percha.

4. The instruments for placing that material into cavities formed by art.

5. The poorer class of teeth upon which we operate every year growing worse.

6. Can human teeth be conserved better if the subject be taken at the third or fourth year, and have a larger number of teeth saved by other materials than the use of gold and the metals?

7. Are we not doing irreparable mischief to our patrons by the use of so much gold, in the early years, up to the twentieth?

8. How far can we go in anticipating caries and have the average dentist do it?

9. How far after superficial decay has started are we justified in attempting its arrest without filling with anything?

10. How far can we ignore self in order to reach our highest aims as a profession to which we have pledged our lives, talents, and sacred honor? To do to the public as we would do to our own families?

11. Have we not in attempting to reach the most perfect results used too many kinds of gold, amalgam, oxyphosphate, and gutta-percha in the same mouth.

12. Failing in all, have we not resorted to instruments that will, like the boomerang, come back to us?

13. Are we doing the proper thing in abandoning filling for a substitute of crowns and bridges, making of filling and saving human teeth a "lost art"?

14. With every appliance, instrument, dam, filling-material, and brains, yet the cry is failure on every hand; you see it in every journal; it is a principal topic of the hour!

15. No better indication of failure than the craze for copper amalgam, mixed fillings, gold and tin, gold and amalgam, amalgam and oxyphosphate, and even gutta-percha, to prevent recurrence of caries at the cervix!

16. I told you of the ignorance extant of not knowing the laws of articulation and the true mechanism and function of the human teeth.

17. I told you of the utter failure to keep the first permanent molars as far back towards the ramus that the arch may attain its normal size, symmetry, beauty, and usefulness.

18. I told you of the sin of cutting indiscriminately the approximal surfaces of the teeth, and flat fillings and fillings not enough plus contour and false articulation, the result, and how retrogressive steps in and the heredity is tainted.

19. I called your special attention to my sheet-anchor in this holy war against caries and irregularity; of the manner in which I use pink gutta-percha, not only as a permanent filling in the temporary but the permanent teeth, and how I gain the full plus separation for proper contour.

20. I told you how little occasion I have for conservative treatment of the dental pulp.

21. How pyorrhœa alveolaris never invades my domain with original patients.

22. I told you, also, how I make it a first and principal active factor in the treatment of pyorrhœa alveolaris, and by recognizing the laws of articulation.

23. I told you still further that with it all I am still not satisfied that I have done all I might, because I cannot have command of the environments and circumstances, nor can I reach but a short distance from my centre of action.

24. I told you I was swinging the pendulum as far as I could beyond where I wanted it to go; that some one would have the courage to do the same thing. It will thus come to the regular beat and more perfect time (operations) be kept.

25. I told you what I do for gold and oxyphosphate fillings to hermetically seal them and make more lasting.

26. I explained how we can in our labors make art more our study and do as nature always seeks, the nearest way to accomplish her purposes.

27. How we can make art conceal art.

28. I tried to impress you with the importance of having greater spaces for contour between the molars than the bicuspid, and less with incisors. That it is to permit the alveolar processes grow up once more to the cervix, to have the gum attach itself, and there prevent any pocket for food or secretions.

29. And yet I pray, as does the Freemason, for more light.

30. I felt I had a right to assume from forty years' varied experience, with a long line of precedents, the association with inventions that the world everywhere has adopted; and, above all, the desire to unselfishly do for not only the public, but for the benefit of dentists everywhere.

31. With all this, you cannot expect me to do any more than

give you the results of my hourly and daily experience and intercourse with a larger number of practitioners in dentistry and medicine than few others in our ranks have enjoyed. It is not for you to antagonize what is given; not to claim it for yourself that you have done the same thing. You must lose the credit if you do not make it known on the house-top when you first did it. Do not wait until another promulgates it.

32. Now I am through; go on, please, with your criticisms, but remember, that if I have failed to do the best by you, you must, while criticising, do more and better, and show your work in a clinic and not place it under a bushel.

DISCUSSION.

Dr. Lord.—It is exceedingly unfortunate that our good friend Dr. Bonwill is not able to hear the speakers. He has come here to listen to the discussion, and I would suggest that it be so arranged that he sit as near the speakers as possible, so he may hear as best he can. I feel quite a little embarrassed on account of the reading of what might be called a second paper. I proposed to discuss the paper that was read at a previous meeting and published, and this has gone over much more ground than we had before, and there are a great many things in what has just been read to us that we did not hear of before. It is to be hoped that the paper will be very thoroughly discussed by those present. Dr. Bonwill has very freely given his views; I hope the gentlemen will do likewise. I do not like to speak first on the subject; I would much rather that some one who is more able should do so. I have written what I have to say, and with your permission I will read it.

I confess that I am a good deal at a loss to know what to say about the paper, particularly in regard to some of the statements contained in it. It was said by Dr. Perry, when the paper was read, that there was good in it; but I think that we want more especially to speak of that which is bad or not so good, and let the good take care of itself. It is always well to commend whatever is good.

The paper shows interest in the subject of progress, and yet many of the points are not clearly or definitely stated; but as the author of it is an enthusiast, he is more or less excusable for some mistakes; indeed, we had better make mistakes now and then than to say or do nothing.

A great deal of ground was gone over, but most of it was not new either in theory or practice; so it is not easy to find where

the "new era" comes in; and some of the statements, if taken literally, are contradictory. For instance, it is stated that "gold is a failure," and also that "gold, in itself, is good for preserving teeth." Now, perhaps it was meant that gold is a failure when it is not properly used, or where it ought not to be used, and also that it is a good material when used just when and where it is proper to use it. The statement that the "use of tin and gold in combination is another proof of the failure of gold when used alone" is very wide of the truth and facts of the case as understood by those who use these two metals together. There is one short sentence in the paper that struck me with great force as eminently true and valuable, and it is this: "There is no greater error made than to suppose it is necessary to have various qualities and forms of this metal." It has seemed to me to be most unreasonable that so many forms of gold should be called for and put upon the market, as it cannot but be misleading to the inexperienced, and is wholly unnecessary, in my judgment, in order to secure the best results.

That too much importance and value are given to the use of plastics in the paper, as they are thus far developed, would seem to be unquestionable, as well as inconsistent with sound reasoning and experience. The views are much in the wake of the "new departure creed," which has, in my judgment, greatly depreciated the art of dentistry.

The very high value put upon amalgam as a filling-material by the author of the paper is counter to the views of a very large majority of the profession. The question of the use of this material in the treatment of decayed teeth was discussed last May by the Illinois State Dental Society as the subject was never discussed before, and by some of the very best men we have; and the consensus of opinion and judgment was that it should only be used in extreme cases. That amalgam has its place as a filling-material is not questioned, except by perhaps one in a hundred of the dentists of all the land; but to recommend and use it as the "sheet-anchor," discarding (at least in a great degree) the use of foils, is something that the strongest language is too feeble to condemn. I need not again say much about the reason or reasons why amalgam is *not* so good a filling-material as foils of tin and gold. Of course good fillings made of amalgam will do better service than those that are bad; but the rule is that they change in some way or from some cause,—the margins become imperfect either from expansion or shrinkage, and leakage is the consequence,—so that the objection to its use is in the material itself; whereas if the fill-

ings of gold- or tin-foil are made perfect, there will be no change in them, or no such change as occurs with amalgam.

It may be said that all dental operators cannot make perfect fillings of either of the foils. I do not understand that this is the question under discussion. But I believe that if amalgam had not been used to the extent that it has we should have many more perfect operators. And I will take the liberty of saying that my belief is that dental students should not have anything to do with using amalgam until towards the end of their last year at the schools. They will, in such a case, be much more likely to get a better knowledge of how to use or pack and condense either of the foils.

That which is said in the paper on preventive treatment I must regard as showing as great a difference of opinion among us as there is in regard to filling-materials. It is a most interesting subject, and one that has not received due attention as yet; but the world advances, and we may expect better things in the future.

There is one point in the paper that I do not altogether like to speak of; yet our good friend Dr. Bonwill has used great freedom in speaking of his brethren,—of their qualities and qualifications,—having the courage of his convictions, which is quite commendable in any one, as we must have convictions and stand by them. So I trust that he will not be offended at a little personal allusion, which is, the assumption of so much superior knowledge and skill.

Dr. Perry.—I must apologize in all sincerity to Dr. Bonwill for not being able to discuss his paper, although I intended to do so. I was in Europe when it was published, and when I came back I found my hands more than full, and since then I have not had a chance to read it. I tried to do so to-night before I went to dinner, but a number of suffering patients came in, and I had to attend to them. As far as discussing the *résumé* is concerned, it is hard to do that. Dr. Bonwill has over thirty-two points in it; one for each tooth; he has been forty years in practice, and I thought when he was reading it that he would give us one point for each year.

Dr. Bonwill, we are glad to see that you do not make great wide spaces as formerly. We are glad you make full contour, and that you do not anticipate decay any more. We are glad you do not use gold for children's teeth, but we are sorry you do not discriminate more and say you use some of the metals for them. We are glad you use gutta-percha, but we are sorry you use so much of it and stuff it so much between the teeth and into tooth cavities. It is easy enough to wedge teeth apart in two or three days and fill them,

and have it done and off your mind. When you stuff gutta-percha in and let the patient bite on it for six minutes, the teeth get beyond control and become disarticulated. If you use it for young people, and make the distinction for young teeth, we will not complain at all. We will be proud of you for having the courage to tell of it. We are glad that you are coming around to the full contour. We are glad to see you advocating amalgam, but we are sorry to see you, of all men, using it where gold could be used.

If I remember rightly, the other evening you started off with a general proposition that gold was a failure. It is not! It is a grand success. It has made a success of our profession. It is the best material to-day for filling teeth in most cases. Instead of making failures throughout the profession, we are making great successes. We are doing better work every year, and doing better work through your efforts, and by the things that you have invented and taught us to use and to know. But we do not like to have you make such unqualified statements.

Dr. S. B. Mills.—I think what Dr. Perry said was absolutely true. When Dr. Bonwill said gold was a failure, I believe he was right from the stand-point that he uses it. Dr. Perry was right from his stand-point. But there is a golden medium. Dr. Flagg, who was very much misunderstood, made the statement that, in proportion as a tooth needs saving, gold is the worst material to use. The reason is this: I suppose I am safe in saying that seven-eighths of the teeth we are called upon to treat are of poor structure, and a large number of teeth are made useful in which we would not think of using gold. A large proportion of the fillings that are made to-day by dentists are in teeth of poor structure. Taking the mass of the profession, they can do a larger proportion of useful service to the public with the use of the combination materials, with the expense of less energy to the patient and operator, and far less expense in money. You all know I have been an enthusiast in the line in which I work; but, if I were to live my life over again, with the experience I have had, I would change my course of practice. I have spent the energy that my patients never should have lost, and spent my own energy also, and sometimes with not the best of success. I have been forty years in practice, and I have made observations in this matter, and I have come to the conclusion that there is a golden medium in practice. Amalgam, as it can be used in the hands of men who have the ability, and with the materials that we have now, is of great advantage to both operator and patient.

Dr. Jarric.—I do not know that I have anything special to say, but there are a few things that I would like to give voice to, both from my recollection of the paper and from what has been said to-night. One of them is the necessity for more conservatism in statement and practice. We all know that Dr. Bonwill is an enthusiast. He enters into almost everything he says and does with such a degree of enthusiasm that his statements and actions are likely to be extreme, and they impressed me as being so when I listened to his paper. As I remember the paper, in the early part of it there was severe denunciation of the incompetency of dentists generally, stating that vast numbers of failures were constantly seen in the mouth. I do not think the failures we see in the mouth are always, or nearly always, to be laid to the incompetency of the dentist, or always to the material that is used in trying to save the teeth. A large number of teeth that come to us decayed commenced to decay quite early in life. Those teeth originally were perfect. The environment of those teeth was such that decay set in. Let those cavities be filled ever so perfectly, and with the material best fitted to the purpose, after they are filled they are not so perfect as the original unbroken surface of enamel. Let the same environment continue and the constitutional conditions remain unchanged, and those same teeth are almost sure to decay again near the former points of decay, and owing not to any faulty operation. It is the most natural thing in the world for this to occur, and the marvel is that we do not have decay more frequently near to where cavities have been filled. We must use good judgment in the selection of filling-materials. From my own experience, and from what I have seen of the operations of other men, I believe that in two-thirds of the cavities which we fill in permanent teeth gold is the best material to use. I believe that the tooth-substance takes as kindly to the gold, in this proportion of cases, as any other material, and the absolute failures in the operations where gold is used are due more to mal-manipulation than to the gold itself. A failure in an amalgam filling may not be due to improper manipulation, but to the material itself. It hardens by crystallization, and the consequent change of form makes the result uncertain, even with the most careful manipulation. With gold, it is not the material that is faulty, but it is the manipulation of it. This was a very pertinent distinction made by Dr. Lord in his paper in regard to the filling with gutta-percha between frail teeth. The gutta-percha serves two purposes,—allowing the surface of the dentine to harden under it, and the attrition upon the gutta-percha causing an enlargement

of the space between the teeth so that a permanent metallic contoured filling may be put in. I believe this is a very good practice in many cases, particularly with the teeth of young people up to eighteen years of age. I have done it for years, and I continue to do it. In case of approximal decay in frail teeth, I fill cavities and space solid with gutta-percha and allow it to remain for one, two, three, or four years, according to circumstances; the circumstances being the health and strength of the patient, the amount of the material that has worn away, and various other things. I think the paper will do good in calling our attention so earnestly to certain points. Sometimes a strong statement will attract our notice, whereas if the same facts were put in a mild way, it would be passed over and not so much attention given to it.

Dr. Bonwill.—I hope you will have time enough to hear what I have to say, and particularly for my friend Dr. Lord to discuss anything that may be necessary to settle these questions. With all due respect for the pioneers in dentistry; with all that love we have for the person; with all the magnitude of feeling that we may cultivate, we must throw aside certain things if we are forced to take care of ourselves. I will not be insulted or hurt by anybody, especially by Dr. Lord. I know he does not mean it. I know there are some things that Dr. Lord does not know. We might talk forever upon dental subjects which come up over and over again. You see history repeating itself. I have not attempted to present anything but what I have done in my practice. I do not ask any one to follow me; I do not care whether they follow me or not. I go on my way no matter how many obstructions I meet. I have the consciousness just how nearly I am doing right and wrong. I do not begin even yet to come up to the goal which I would like to reach. I have not said that gold is a failure. There has not been a word in my article or an action in my life that has told you that. I simply would repeat what Dr. Perry has said, that you are indebted to me for the best instruments for the purpose of making more thorough operators. Don't you suppose I love my own children so well that I would not do them any injustice, but for their sake favor the use of gold in every possible case? I have gone into so many offices where the operators did not know how to use my instruments. Each one of us, as Dr. Bogue said the other night, has a peculiar practice. I do not know what Dr. Perry's practice is. But the failures will come. So far as my own practice is concerned, I use gold in every mouth, but I use it less than I did in the large cavities that come to me which are failures

of other men. If you gentlemen will simply bring some of your patients, not to show how we can do a thing, but to show how we have done it, it would be better. We can talk as much as we please, every man has his own conclusions. You have no idea of the number or character of his patients. There are people who have been his patients for years. He saves teeth, and he saves them with gold. With all his operations, he does not come up to that standard which we all admit to be perfect. There is not a man but should use a mallet of some kind. No man can stand at the dental chair without using power instruments for the packing of gold. Dr. Lord does not do it.

I not love gold? I call it a failure? No, it is not so. It is not in the material that the failure comes; it is in the manner in which men fail to recognize certain principles in the preparation of a cavity, in cutting the cavities as far as you can from the centre, making the fullest contour that you can. That is what I do when I tell you to make a plus condition. I tell you how I save so many pulps from destruction. I tell you how I save so many teeth from subsequent caries. I have had some of Dr. Lord's patients, and he has had some of mine. I have had patients of almost every man of prominence in the land. I have come in contact with a larger number of dentists and materials and instruments than any man in the profession. If my friend Dr. Lord would come and stand by my chair and see the immense destruction of the human teeth that comes into my hands, he would say I was doing right. One of the most rabid men in Philadelphia in the use of gold was in my office one day. A patient of mine came in, and in that patient's teeth I had placed some large gold fillings. In the majority of them, however, I put in large amalgam fillings. I said to this dentist, "Will you please tell that patient whether I have done wrong in putting so much amalgam in his mouth?" He looked from every standpoint, and he said, "I do not see how you could have done otherwise."

I still put in immense gold fillings, and Dr. Lord never put in a larger gold filling than I did at a clinic at the University of Pennsylvania, where I used three books of gold in one tooth, and did it in forty-seven and a half minutes. The reason I use so much gutta-percha is to get the tooth-substance as far away as possible. Unless you do that, your work is largely in vain.

There is another point that I wish to speak about that none of you have noticed. You all speak as if you seldom use amalgam, and yet every one of you, I know, uses it, even Dr. Lord. I know

just how much amalgam is used by others, and am willing to bring my practice to show you how much good I am doing with it. A dentist has no right to condemn operations performed by another until he knows the peculiar environments around which the operator has had to work. If any man has a right to say what I do about amalgam, it is myself, after I have given you the best instruments known to dentistry for filling with gold. I was told when I was in the West, "Bonwill, don't say anything against gold." Some of them said they would not use my mallet. I asked why, and they said, "If our patients knew we filled teeth in half the time, they would make us charge less." I have been all over the country and learned many good points from some of the men.

Dr. Perry may be my friend. He must know, taking my practice altogether, that I have some right to a following, and I know I have a following; and if I could have Dr. Lord stand by my chair and see my operations, he would say the same thing as other men do, that I am doing a noble and useful work.

I would not recall one word.

It is to be regretted that gentlemen are so very careful what they say about the use of amalgam in their own practice that but few present rise to the discussion, which is not very complimentary, to say the least.

I said all that was necessary in my article, and I thank those gentlemen who have spoken.

A vote of thanks was offered to Dr. Bonwill.

Adjournment.

JOHN I. HART, D.D.S.,
Editor New York Odontological Society.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

THE regular monthly meeting of the Society was held November 10, 1894.

After the close of the routine business of the Society, the President, Dr. Pierce, stated that Dr. Henry Leffmann would read a paper on "Hydrogen Dioxide as furnished to Dentists."

(For Dr. Leffmann's paper, see page 78.)

DISCUSSION.

The President.—You spoke of acidity and non-acidity. Could you give us any idea whether the acidity of Marchand's peroxide is sufficient to have any deleterious effect?

Dr. Leffmann.—The acidity in Marchand's peroxide amounted to about eight in the test made to-day against about four, which is the minimum of the Oakland. The acidity of the pyrozone is about two for the same volume. Fifty cubic centimetres should not require more than five cubic centimetres of decinormal sodium peroxide to neutralize the acid present. Pyrozone shows about two, Oakland four, and Marchand's usually runs up to more than six or seven. To-day the sample, which was rather strong, ran to eight. If we were to dilute it to ten volumes it would reduce the acidity.

Marchand's article is undoubtedly being improved, and I think the later samples examined show a considerable decrease in the acidity, while the strength is greater.

A sample of Merck's, tested last February, was extremely acid. Two samples were obtained from different houses, and were found to have very little active oxygen (a little over one volume), but both very acid.

A sample of English hydrogen dioxide which I examined costs one dollar for a four-ounce bottle, and contains only about six volumes of active oxygen.

How imperfect must the treatment be that depends upon such inferior articles!

Dr. Deane produced a bottle of hydrogen dioxide, and said,—

"Since hearing this paper I would say I have here a bottle left by one of Marchand's men, and I used it in the ordinary way, and brought upon myself a great deal of trouble. I washed an abscessed bicuspid in the usual manner, and the patient not only lost the root, but the results were quite serious for ten days."

Dr. Leffmann asked if there were any of the material left.

Dr. Deane answered that there was, and Dr. Leffmann said he would be glad to take it and make an analysis of it.

Dr. Leffmann.—Dr. Thomas S. K. Morton received a sample of the Marchand article, left at his house by an agent, and it stood in a small side closet for some weeks. One of the members of his family became sick with diphtheria while at the sea-shore, and he was sent for. He thought he would take down, among other things, a bottle of hydrogen dioxide. He went to the closet and took up the sample unopened, and then, remembering the article I

had sent him, packing up a bottle of Oakland hydrogen dioxide, he took the train. About thirty minutes after he left, the people in the house heard a violent explosion. They went to the closet and found the bottle containing Marchand's dioxide torn into powder, and two or three other broken bottles lying on the floor. The decomposition had started, and the gas had gone on accumulating until the limit of pressure had been reached. Had that explosion occurred in his hands, it would probably have blinded him.

These accidents need not occur in properly made solutions. This sample may have been hydrozone. I find the hydrozone to contain a little less than thirty volumes.

I may say that so erroneous are the ideas on this point that when Dr. Wayne called upon one dealer, and at my suggestion asked for Oakland dioxide, he was told, "We don't keep it. Here is a brand that makes a big noise when you open the cork." That was a sign of decomposition. The best articles do not make a report upon lifting the cork.

Dr. Gaskill asked Dr. Deane if there was a fistula at the end of the root he referred to.

Dr. Deane answered that there was; that he was treating it from the outside through the fistula.

Dr. Gaskill.—Could you pass the fluid through the root?

Dr. Deane.—No; I was treating it from the outside.

Dr. Gaskill.—I used the sample, and used it very successfully, without any indication of trouble, and also found it valuable as a mouth-wash when there was inflammation of the gums. The patient used it three or four times daily in a diluted form, and after a few days the mouth showed a thoroughly healthy condition.

I forced it with the hypodermic through the root and fistula, and in twenty-four hours there was no sign of the opening to be seen on the gum.

Dr. Deane stated that he used it in two or three other cases, and found he was getting into trouble; that he had found the bottle always gave a slight explosion upon opening; and he thought if Dr. Leffmann, who had the bottle, would open it now an explosion would follow.

Dr. Gaskill stated that in his experience there was so much pop to it that the patient was startled, the cork being blown out onto the cabinet. He still used it, and with good results.

Dr. Faught.—I am sure we are all very much indebted to Dr. Leffmann for these accurate statements we have received in regard to hydrogen dioxide. I have used it in dental treatment, but my

experience with the article has been largely in another direction. I began by using Marchand's solution, and always had a bottle of it in the house. I look upon it as a very good agent for application to the tonsils in their incipient inflammatory stages. I have one child who has a strong tendency to tonsillitis. Every winter he would lose his schooling and be in bed, while the younger children would be more or less affected. I reached the conclusion that a little care on my part would obviate his retirement from school to bed, so I began by keeping a bottle in the house in a cool place; yet on going to get the bottle I would very often find the cork blown out, even where it had been wired down. From the suggestions of Dr. Leffmann I substituted the Oakland Chemical Company's product, and I have had most excellent results. That article I have on hand constantly, and about once a week, or two or three times, just as opportunity occurs to me, I call the boys up in the morning and make an examination of their throats. If there is the slightest thready depositions, as we often see in cases of tonsillitis, I make an application with a swab that morning and the succeeding morning. I look upon it as prophylactic treatment to prevent the occurrence of diphtheria, and have always utilized hydrogen dioxide in this way to destroy germs upon the tonsils.

Dr. Luckie said he would like to ask Dr. Leffmann what the chemical results would be of mixing bichloride of mercury with pyrozone or hydrogen dioxide solutions, and if a good germicide could be obtained from such a solution.

Dr. Leffmann.—I have never made the experiment, but would be inclined to think you could make the mixture of corrosive sublimate with hydrogen dioxide, and that you would get a very efficient germicide that way. However, hydrogen dioxide is a peculiar body, and does not always mix well with certain substances that in theory ought to mix with it.

Dr. Pierce asked Dr. Leffmann if he understood him to say that the poorer solutions obtained were simply hydrochloric acid diluted.

Dr. Leffmann.—Yes, hydrochloric or sulphuric acid. Those noted to-night contained ten volumes, or three per cent. One-half volume would be one-twentieth of three per cent.,—a very small amount of material. The acid in that is an important ingredient. In all commercial hydrogen dioxide there is an acid. It does not keep if it is neutral; it does not keep in an entirely alkaline solution, but the acidity ought to be simply sufficient to preserve stability.

JOSEPH HEAD, M.D., D.D.S.,

Editor Odontological Society of Pennsylvania.

HARVARD ODONTOLOGICAL SOCIETY.

AT the regular monthly meeting of the Society, held July 7, 1894, President Eddy in the chair, the following paper was read:

THE CARE OF CHILDREN'S TEETH.

BY N. A. STANLEY, D.M.D., NEW BEDFORD, MASS.

MR. PRESIDENT AND GENTLEMEN,—The subject to which I wish to invite your attention this evening, and one which, I think, does not receive sufficient consideration among general practitioners, is the care of deciduous teeth.

The task of filling children's teeth is a very difficult one, and because of this difficulty, and the short period that the deciduous teeth are to be retained, they are often entirely neglected, or not given due consideration.

Preserving the first teeth is a very important duty, and one that every dentist should not shrink from, but make every possible effort to perform.

It is Nature's design that these teeth be kept in their position until the permanent teeth which follow them are erupted, and any deviation from this plan is detrimental to her purpose, which cannot be improved upon. It is pre-eminently the office of the dentist to assist Nature over this difficult period, and in the performance of this duty he will often find his resources taxed to the utmost.

What are some of the results that are likely to follow the too early extraction of the first teeth?

1. The jaw does not develop as it should and as it otherwise would.

2. The permanent teeth erupt more irregularly.

3. The permanent teeth that are erupted one or two years before they should be are not fully developed, and will not resist decay with the same vigor as teeth coming at their natural period.

What are some of the results which follow preserving the first teeth?

1. A good surface has been preserved so that proper mastication can take place, and the development of the jaw can go on to the extent Nature had intended.

2. The permanent teeth, having been kept back until their natural time of eruption, are now in a normal condition.

But this is not all that has been accomplished. The young

patients have been taught the importance of taking care of their teeth, which lesson will, in all probability, last them through life. We are able to restore the natural contour to a decayed tooth by means of the various filling-materials at hand; but we should try to do more. We should so strive to do our work and instruct our patients that future generations may inherit a dental structure less prone to disease.

The time to begin the improvement of dental anatomy is in childhood,—fœtal life, if you please.

We should prescribe the lime needed to supply the demand upon the parent system during pregnancy. I have done this in my own practice with confidence in its efficacy, and always with the cordial approval of my patient. The lime supplied will aid in the development of the fœtus and thus preserve the structure of the mother's teeth.

No doubt every one of us can call to mind instances where mothers have through ignorance neglected this provision during such periods, and we have seen disastrous results follow. Nor should we cease the supply after birth, for the demand is then greater. Every dentist can recommend the use of lime-water in the child's food, and I believe some of the best results can be obtained by following this practice a few years.

Every practitioner has methods of his own, and if he is a wise man he will have occasion to change them very often. It is impossible to follow any fixed rule; the operator's judgment must counsel him in almost every case. In our professional relations with children the first thing to be obtained is their confidence, and in order to accomplish this we must be very patient and avoid hurting them all we possibly can. I never keep a very young child in the chair longer than ten or fifteen minutes for their first experience; if they become restless and uneasy it is better to dismiss them and finish the operation some other day. By this means I soon have the confidence and friendship of my little patients firmly established.

It is my custom to see them once in three months. I don't expect to always make a thorough excavation; it is impossible.

In filling approximal cavities in the front teeth I almost invariably use cement; in the greater per cent. of cases I think it more satisfactory than any other filling.

For crown cavities that are not too deep I use amalgam, but if they are badly decayed I prefer cement or gutta-percha, as a large amalgam filling is more apt to destroy life.

For buccal cavities and those at the margin of the gums I believe there is nothing better than gutta percha.

I have had greater difficulty with approximal cavities in the molars than any other; the corona-distal surface in the first molars, especially the lower jaw. The filling I have the best success with here is a combination of amalgam and cement, amalgam at the cervical wall. Should a pulp become exposed, I should at once proceed to destroy it, and fill the pulp-cavity with cotton and iodoform.

Finally, we have to extract these teeth. The agent I have used for a number of years is chloride of ethyl, which works beautifully; it is unnecessary to spray the parts until white; this might cause sloughing.

The children of the present generation should have, when they grow up, better teeth than their fathers and mothers have to-day. Without careful, faithful attention to the first teeth, I believe it impossible to attain results which our patients have a right to expect.

DISCUSSION.

Dr. Noble.—I would like to ask Dr. Stanley what preparation he uses to destroy the pulps of temporary teeth?

Dr. Stanley.—Arsenic.

Dr. Noble.—Might not complications arise from the use of arsenic where the roots are partly absorbed?

Dr. Stanley.—I will not say that there might not, but I have never seen a case. I should use a *very small* particle and see the patient within a few hours; the same day, if possible.

Dr. Cooke.—Will Dr. Stanley please tell us how he knows that these permanent teeth that erupt early do not resist decay as well as they would if they erupted two or three years later?

Dr. Stanley.—From observation.

Dr. Cooke.—Do you compare it in the same mouth, or compare one mouth with another?

Dr. Stanley.—In the same mouth.

Dr. Cooke.—What teeth do you notice go quicker on that account?

Dr. Stanley.—I think the bicuspsids will suffer most.

Dr. Cooke.—What sort of cavities do you find in such a case, fissure or approximal?

Dr. Stanley.—Fissure.

Dr. Cooke.—I don't know whether a case of that kind would prove that the tooth would not last through life if proper attention

was given to the cavities. Whether the early eruption would have any influence against the ultimate keeping of the tooth through life it seems to me is a question.

One other point occurred to me in connection with the deciduous teeth, and I would like to ask the essayist or any of the gentlemen here whether trouble has been experienced with the six front teeth, either above or below? For instance, we have a great deal of toothache in the temporary molars, and we see in the incisors above good-sized cavities, and in many of them the pulps are dead. I have been running the matter over in my mind, and I cannot recall a case that has caused me any trouble in treating a tooth or has required any particular attention in any of the six front teeth. Our work is always in the molars, and if there are any cavities in the incisors they will not cause the patient much, if any, trouble, because there is not much pressure there, while the constant crowding in of food between molars and bicuspids is what brings the patient to us. I have noticed cavities in the incisors, but I have never tried to fill them, because they did not seem to require attention. I should like to know if the others present have had the same experience in this matter.

Dr. Stanley.—In the majority of cases the trouble proceeds from the molars, but I have had cases where the canine caused a great deal of trouble. I think there have been two occasions where I have had to treat the canine, which caused much pain and swelling, and in another instance there was similar trouble with the left superior central.

Dr. Cooke.—My question was, Does trouble come as a rule from the six front teeth?

Dr. Stanley.—I should say not.

Dr. Reilly.—In answer to Dr. Cooke's question, I would say that I have considerable trouble with the temporary canines, almost as much as with the temporary molars. I had one case in my own family, my little boy. Decay had started in the canines, and I was obliged to remove the fillings, and have an assortment of instruments at home to keep the canals clear. I have had many patients in my practice where there was trouble with the canines. With the centrals I don't recall any serious trouble.

Dr. Stanley.—In the particular case I referred to the crown finally broke off, but I intend to keep the root there if possible until there is some sign of the permanent tooth making its appearance. I treated the root, leaving a dressing of cotton and iodoform, and then filled with cement, and left a small opening through the

filling. It has been there for some weeks, and has not given any trouble. I shall not be surprised if it does, but I shall treat it again in the same way.

Dr. Cooke.—I had in mind incisors more than canines.

Dr. Smith.—I would like to ask the essayist his method of treating the temporary molars after he has destroyed the pulp?

Dr. Stanley.—I should syringe the tooth out with warm water and treat with a three-per-cent. solution of pyrozone; then I should apply a dressing of cotton and iodoform to the pulp cavity, and put my filling over that immediately, keeping it as dry as possible while I work. I should not undertake to fill the roots solidly.

Dr. Smith.—Do you use the powdered iodoform?

Dr. Stanley.—No, I make a paste, and saturate the cotton with it. Of course you cannot do an ideal operation on a child five years old; you have simply to do the best you can.

Dr. Page.—My youngest patient with abscess was a child two years and nine months old.

I have always given the same treatment to the deciduous teeth that I have to the permanent, and in the case of an exposure I use arsenic as I do for a grown person, except that I use a much smaller quantity. I have a large number of those exposed pulps and abscesses, and it is extremely rare that I have one to re-treat. I have always practised Moffat's treatment, which I was taught at the school,—that is, a thorough opening of the pulp-chamber into all the root-canals, treating with creosote and tannic acid. With this treatment I have succeeded better than with all others that I have tried.

Dr. Reilly.—Did I understand Dr. Page to say that he does not fill the roots of deciduous teeth?

Dr. Page.—I do fill them.

Dr. Stanley.—I do not want Dr. Smith to think that I do not treat the permanent teeth more than once. It is about ten years ago that he taught me how to treat a tooth in which the pulp had been destroyed, and it has remained by me ever since.

Dr. Smith.—I did not suppose that for a moment. I wanted to know how you treated the temporary teeth. The method of treating the canals by thoroughly disinfecting the pulp-chamber is one that has been pursued by Dr. Allan, of New York, with a great deal of success, and has been published in one of the dental journals; it consists in making it thoroughly aseptic, placing a small disk over the entrance into the pulp-chamber, and then filling the tooth. It seems to me a very good way, having the advantage of

being doubly sure, for, should there be any trouble, it is a simple matter to drill a vent below the margin of the gum, and it would not be difficult to remove the entire filling.

I was interested in what Dr. Cooke said about the deciduous anterior teeth. It struck me forcibly, because his method of handling the incisors is evidently the same as I pursue,—that is, I don't handle them at all unless I am obliged to; in fact, it is rare in my practice that I find it necessary to fill the temporary incisors, either superior or inferior.

Dr. Werner.—Have you ever filled a temporary incisor?

Dr. Smith.—I don't remember of any instance where I have. My associate, Dr. Banfield, has a little boy, a patient of his, about five years old, for whom he is filling the temporary incisors. I know of the case simply from his telling me about it, and have not seen it. I am obliged to fill the temporary cuspids and temporary molars, and there my work with children's teeth seems to end. It seems important that we should have a satisfactory method of filling the approximal cavities in temporary teeth, and I shall be glad to hear from the members the different ways of treating these cavities. At one time I used to file these teeth apart and treat them on a bevel, carrying the separation down to the gum margin, leaving the teeth in contact, and then filling the approximal cavities on that bevel, but the food would get in more or less, and now I do not file between temporary teeth, neither do I separate with wedges, as some do, but my method of late has been to cut down from the crowns into both approximal cavities, and fill those solidly with gutta-percha, and it works beautifully. There is no trouble with gum tissue, and when it wears it can easily be replenished.

I rarely use amalgam in temporary teeth, as I am somewhat afraid of it. I have seen cases, little patients of mine, who have had the sixth-year molars filled with amalgam, and the pulps have died. A family, in which there are three little daughters, went abroad, and while there amalgam fillings were placed in the mouths of each of the children, and when they returned, there was a pulpless sixth-year molar in each of their mouths. I have seen evidence enough to satisfy me that the use of amalgam in temporary teeth oftentimes produces death to the pulp through its influence.

President Eddy.—May I ask Dr. Smith in what way it acts to cause the death of the pulp?

Dr. Smith.—I don't know what the influence is, but I have concluded it is a dangerous thing to use in soft teeth. I have seen many bad results from it.

Dr. Werner.—Mr. President, I would like to say a few words. Gutta-serena in approximal fillings of temporary teeth I spoke of some fourteen years ago. I do not claim that it was original with me, but I have practised it for perhaps eighteen years, and in nearly all cases of approximal cavities between the bicuspid and sixth-year molars I would treat them in that way.

I want to talk in the line of Dr. Cooke's questions, which he did not follow out as much as I hoped he would, whether the premature extraction of the temporary teeth in any way affects the eruption of the permanent. That is a very vital question, and I do not agree at all with the statement of the essayist in regard to it. I do not believe that the extraction of the deciduous teeth has anything to do with the eruption of the permanent. It could only make a difference of a very few weeks or a very few months, and could have but very little influence in regard to the character of the erupting tooth. When the essayist spoke of that I think he must have had in mind cases where the eruption of the bicuspid has varied from two to four years, when normally the second bicuspid should erupt the year following the first. To my mind that is not at all the effect of the extraction of the deciduous tooth, but rather the effect of a characteristic inheritance, and, I think, on inquiring into such cases you will find that their fathers, their mothers, or some relatives have had the same peculiarity, and you will often observe it in a good class of teeth.

The sensitiveness of the deciduous tooth is nothing compared with the permanent. In destroying the pulp I should use arsenic just as freely in the deciduous tooth as in the permanent. There would not be a particle of danger in allowing it to remain there four or ten days or weeks.

Amalgam should very seldom be used in a child's mouth. I do not see the necessity of putting it in for the short time it is required.

Dr. C. M. Bailey.—I want to emphasize what the gentleman has said about the influence of the extraction of the deciduous teeth upon the eruption of the permanent. The essayist stated that one objection to the extraction of temporary teeth was the influence of that action upon the growth of the jaw, and consequently the growth of the jaw was retarded. I know that is the teaching, but I wish to take exception to that; I question it very seriously, and on the same grounds exactly that Dr. Cooke questions a tendency to decay resulting from the too rapid eruption of the permanent following the extraction of the temporary. We find in all ages all

sorts of irregularities, notwithstanding the care which may have been taken in the attempts to have the permanent teeth erupt in their regular line. It seems to me the work of building up the tissue is a physiological process which is bound to go on, and I doubt whether our interference will reverse the order of nature and cause a contraction rather than an expansion of the jaw. The causes of irregularities of the teeth I think are but very little known. I do not claim to be able to give any reasons for them, but the question is simply whether we have been making a mistake in that line in our teachings in the past and have forgotten that the alveolar process is a bone built around the roots of the teeth for the purpose of holding the teeth in. Of course, we must admit that in crowded cases the bone was too small, but the only thing I question is that the early extraction of the temporary teeth induced that irregularity or caused the contraction of the jaw.

In regard to the filling of the temporary teeth, I do not think I have anything to add to what has already been said, except to say to Dr. Page that he will get as good results if he does not attempt to fill the roots of deciduous teeth as he will if he does. One thing is certainly true with our little patients and their teeth,—they will not so quickly become the subject of disease as the permanent teeth, and ulcerations are not so persistent. Nature is in active operation building up, repairing the process of waste, and carrying away the waste, and it does it better than it does for an adult, so there is not so much danger of those results that we dread with adults, and in the matter of the sensitiveness of the pulp of a deciduous tooth my own experience has accorded with that of Dr. Werner. They are not as sensitive, they more readily yield to the palliative treatment, and give less pain, and more readily succumb to any attempt to destroy them than do the pulps in permanent teeth.

Dr. Page.—I have had many centrals and laterals to fill, and I think my records show that a good many of them were abscessed. In many cases, as near as I could make out, the cause of the pulpless condition was a blow or some injury.

Dr. Reilly.—I would like to ask Dr. Smith what he does with caries of the deciduous incisors, or if he has no dead pulps?

Dr. Smith.—I see decay there, but I keep watch of it, and my experience is, the child has no trouble whatever in the way of tooth-ache, and the teeth stay there until their successors follow them.

Dr. Reilly.—Don't they keep on decaying?

Dr. Smith.—Probably they do; but if they serve their purpose as temporary teeth, why fill them and cause your patient unneces-

sary pain and expense? I think that is a matter regarding which there should be a definite course of action. Take, for instance, a young man just from dental college: he would be apt, when the little child came to his office, to think that it was his duty to fill those teeth, but if he would let those cases alone, I think he would find that they would not cause him or the child any trouble.

I would like to ask Dr. Bailey, if I understood him rightly in his statement that the premature extraction of temporary teeth in no-wise affects the condition of the permanent teeth, in regard to their irregularity?

Dr. Bailey.—What I meant to say was that it does not affect them by causing a contraction of the jaw, or by the arrest of the development of the jaw of the child.

Dr. Smith.—I would agree with Professor Bailey in that opinion. I think it is generally so understood. Dr. Tomes cites a case where all the temporary teeth were taken out and the permanent teeth came in their regular order of development and were in line. Now, I am not quite clear what the essayist said on this point, but if I am not mistaken he claimed that the extraction of the deciduous teeth produced irregularity, not so much in the change of the jaw itself as in allowing the permanent tooth to move forward and erupt in a wrong position.

Dr. Stanley.—The trouble comes in allowing the sixth-year molar to come forward into the second bicuspid's place, and then you get a crowded condition of the teeth; with the incisors and bicuspid in place there is no room for the cuspid to take its position; it is erupted outside the arch and a contracted jaw is the result. I think it should be emphasized that the deciduous teeth be kept in position until their successors appear.

Dr. Smith.—I think that follows if the temporary molar has been removed before the permanent molar has erupted.

Professor Bailey.—I think the same thing. I question the advancing of that sixth-year molar if it has become firmly fixed in its position before the temporary molars have been extracted. I cannot say that I have demonstrated this, but simply put it forth as a portion of my faith, and I think the grounds of our assertions in the past need to be pretty thoroughly looked at before they are finally accepted. I think you will find that the edentulous mouths of which we take impressions do not average much smaller in such cases, showing that the jaw itself was the proper size.

Dr. Cooke.—One other point some of you may have noticed: where the pulps in the temporary molars have died early, and a

fistula is found, the second teeth come down sooner than they do on the other side where the teeth are sound.

Referring to the matter of the filling of the front temporary teeth, I would say that I have had cases where I have filled them. One, a patient who is seventeen or eighteen years of age, still retains her temporary lateral incisors, and when they began to decay I filled them, because I doubt if she will ever have the second ones.

Dr. Clapp.—I would like to speak of a case that was in my office to-day,—the sixth-year molars in the mouths of two sisters. The elder has been an invalid, and on the grinding surfaces of the sixth-year molars there is no enamel. When the child first came to me a year ago these teeth were so sensitive that they were worse than useless for masticating purposes; in fact, when the child used them in eating they caused her a good deal of suffering, and it was a question what to do. I decided to use nitrate of silver, which has been applied several times since the first sitting and with very beneficial results. Of course, the teeth have no more enamel on them than they had previously, but the extreme sensitiveness has disappeared. The younger sister, whom I saw to-day, I am sorry to say, is having just the same trouble with the sixth-year molars that she is now erupting, and I propose to treat them in the same way.

Dr. Grant.—Speaking of the use of nitrate of silver, I want to ask if any one has tried a method recommended, I think, by Dr. Peirce, of Philadelphia, of applying nitrate of silver with blotting-paper? There is no danger of using too much nitrate, as the blotting-paper takes it up and it can be put anywhere without getting it in the mouth. For applying to the bottom of sensitive cavities in temporary teeth it is one of the best things that I have tried.

Dr. Cooke.—Does it change the color much?

Dr. Grant.—It gives a little blue color. It saturates the tooth less than when applied in any other way.

Dr. Clapp.—Do you fill over the paper.

Dr. Grant.—No, simply apply it with the paper; then make a thin pad of asbestos, put it down in the bottom of the cavity, and fill in with phosphate over that. No matter how sensitive the tooth is, you get the very best results, the asbestos is just as inorganic as zinc phosphate.

Dr. Reilly.—I don't quite understand the statement that there is so little trouble with the temporary incisors that it is just as well to let them alone. I have noticed the commencement of decay in my own children, and I have had a good chance to observe. The case that Dr. Cooke has just cited emphasizes the necessity for the

treatment of every case. I always urge parents to be persistent in cleansing them and keeping the stains off, for there is nothing more hideous to me than a set of dirty teeth either temporary or permanent. It seems to me Dr. Grant's suggestion of nitrate of silver and blotting-paper would be a capital one if the discoloration was not too noticeable.

Dr. Cooke.—I remember reading something which is right in line with what Dr. Clapp has spoken of, where teeth were very sensitive at the neck, so much so that even the touch of the lip caused pain, and in that case a weak solution of cocaine with a very small amount of arsenic had a good effect.

Dr. Reilly.—How long did he let it stay there?

Dr. Cooke.—I don't remember. I know that Dr. J. D. White used arsenic a good deal for the extraction of hard roots, and also for the benumbing of the sensitiveness, and rendering excavation painless. I remember reading his description of it, and certainly no man in our profession was better qualified to judge of correct methods.

Dr. Werner.—I saw to-day a case which was treated two years ago in Lucerne by the American dentist there in the same way. I noticed that the buccal surface of the left upper third molar was perfectly black, and I said to the patient, "Nitrate of silver has been used there, hasn't it?" He said, "No; arsenic." I simply took it for granted that he was mistaken, and that it must have been the nitrate of silver. He is an inveterate smoker, and his teeth are coated with black deposit from smoking, and I question very much whether it was arsenic after all.

Dr. Grant.—It is almost the universal custom in France to use arsenic as an obtundent. The French people won't stand anything in the line of pain, so the dentists there use it quite freely.

Dr. Cooke.—Does it turn the tooth dark?

Dr. Grant.—Very often it does.

Dr. Cooke.—Dr. Taft had a case where he used nitrate of silver, and then applied something taking off the stain. I remember his speaking about it, but forget what he used. Perhaps he remembers the case.

Dr. C. H. Taft.—I used iodine and a solution of salt and water, and then cyanide of potassium, with very satisfactory result.

In regard to this question of obtunding sensitive dentine at the necks of teeth, while it is a little aside from the subject of the paper, I want to speak of a method which it seems to me has been overlooked, and yet it is so simple that I thought every one must

use it. I think I was taught it in the dental school. It is to first touch the surface at that point with a little pledget of cotton dipped in alcohol, then thoroughly dry with hot air, and afterwards touch the surface with caustic potash or the chloride of zinc, which renders it insensible to pain or the touch of an instrument.

Dr. Reilly.—Do you mean on the enamel?

Dr. C. H. Telf.—Right at the neck of the tooth where there has been no decay.

As regards the subject of the paper, I was interested in what Dr. Stanley has put before us. The paper seems to have been discussed entirely from a surgical stand-point. The treatment and care of children's teeth, it seems to me, is very similar to that of the care of permanent teeth in adults. In the last two years I have found myself looking at the treatment of all diseases of the teeth and the oral cavity, not only from the surgical side but from the therapeutic as well, and I take the ground that the dentist has a great deal to do in common with the physician in the care of children's teeth, and that it comes within our legitimate field as specialists in medicine to prescribe medicines for the *prevention* of decay not only in the deciduous but in the permanent teeth. Let us take cases, for example, where dental caries is an inherited condition, as is evidenced in scrofulous, rachitic, and syphilitic patients, where we notice at once an insufficiency of the elements that go to make up the bony tissues. I know that the treatment which the physician directs in all such cases is essentially and necessarily a constitutional one, and that there are drugs which will help not only to *prevent* the decay of the deciduous teeth, but of the permanent ones that follow, and which will help to supply those inorganic substances of which the system stands most in need. Such remedies as creosote, causticum, calcarea carbonica, and calcarea phosphoricum are given by homœopathic physicians to make teeth strong and to supply the inorganic substances that enter into them, and therefore I contend that it behooves us as dentists to make such a study of the materia medica as will enable us to prescribe such remedies intelligently, and help to prevent the necessity for surgical treatment. I would like to ask Dr. Stanley if it has ever occurred to him to consider the care of children's teeth from a constitutional stand-point, and, if so, what therapeutic treatment he may have prescribed.

Dr. Stanley.—I recommend the syrup of lactophosphate of lime, generally prescribed by physicians. I have in mind two little children, whose teeth are almost perfect, though they are yet quite

young, one of them being four or five, and the other a year or two older; and I have no doubt this result has been reached by giving them regularly a spoonful of lime-water in their milk. Their parents, both father and mother, had very poor teeth.

In the matter of irregularities, perhaps Dr. Smith expressed exactly what I meant better than I did myself. With the best treatment and the greatest care, the permanent teeth will not always erupt as we desire.

Dr. Werner.—Some one referred to the Arthur method in the treatment of deciduous teeth. I hope no one here has been unfortunate enough to try it, for I think that is the one black chapter in the history of American dentistry.

Dr. Grant.—I would like to make one or two observations in partial reply to what Dr. Werner has said. I had the pleasure of meeting Dr. Arthur when he was here in 1871. He wanted a cast of a perfect set of teeth, and, as I happened to have that, he took a cast of my mouth. At that time he tried to induce me to have my teeth separated, claiming they were so close together that approximal cavities would surely appear within a few years. I told him that they were good then, and they would stay as they were until they commenced going on their own hook. I have always been just as well satisfied that I did not consent, for I am now forty-seven, and no cavities have as yet appeared. The home of that sort of practice is about Baltimore, where, it seems to me, there is more of it done than in any other city, but I want to say that in some cases I am sure it has arrested decay. I have seen mouths where it was beautifully done years before, and not a trace of decay on any of those polished surfaces. I was very much impressed with it, and at times have almost wished that I had the courage to do it in cases where teeth were so much predisposed to approximal decay. I do not condemn the Arthur system so much as some men do. I do not want to be understood as recommending its use, but there are teeth—

Dr. Werner.—That will stand the treatment.

Dr. Grant.—Put it that way if you will; the fact remains that I have seen cases where decay had started in the incisors, and where there was every evidence of a tendency to approximal decay. After the bicusps were cut and filed in that way, they remained in perfect order for years afterwards.

Dr. Werner.—Your own good common sense prevented you trying to experiment in your case.

Dr. Stanley.—I think those cases are exceedingly rare where

you can file off a large portion of nature's protection and have it stand. I have had occasion to see case in my practice. Dr. Davis was one of those who adopted this method of Dr. Arthur's, and he was a man who, if he believed in a theory, was sure to put it into constant practice. I have seen many cases where bicuspid teeth particularly were lost because the protection which nature put on them had been removed.

Dr. Grant.—I made those observations really with a strong bias against the system, and yet with a desire to be perfectly fair and to give it due credit. It was not always practised as intended. Some who claimed to be disciples of Arthur filed the teeth to a point and took off the approximal surface of the bicuspids. That was not Arthur's idea at all. He cut off the approximal palatal surface and left the buccal surface almost intact, so that there was a free, open, V-shaped surface from the buccal to the palatal surface, instead of the saw-shaped tooth which some dentists produced.

Subject passed.

HENRY L. UPHAM, D.M.D.,
Editor Harvard Odontological Society.

CENTRAL DENTAL ASSOCIATION OF NORTHERN NEW JERSEY.

DISCUSSION OF MR. ALBERT E. WOOLF'S PAPER ON "AN ELECTRICAL DISINFECTANT."

(For Mr. Woolf's paper, see page 65.)

Dr. Watkins.—If this electrozone should be injected into a canal, so as to come in contact with the tissues at the end of the canal, would it act as an irritant?

Mr. Woolf.—I am glad that question has been asked, because it is a point that I did not touch upon. The doctor asks whether, if the disinfectant were to be injected into any of the canals so as to come in contact with the sensitive membrane lining it, it would act as an irritant. My answer is this. They have been making extended experiments in France with chlorine, and they find that, while chlorine acts as a germ-destroyer, it also acts as an irritant. I saw in last Sunday's *Herald* a report of some experiments made by saturating cotton with chlorine gas and applying it to dis-

charging ulcers, and in the course of two or three weeks they found the ulcer much benefited. Now, the cure has been effected long before the two or three weeks elapsed, but it took two or three weeks for the inflammation that has been set up by the chlorine gas to subside; it took that long to get rid of the effects of the irritation set up by the chlorine. Now, this electrical disinfectant is not an irritant; on the contrary, when it is applied to the most sensitive sore it is soothing. For example, if you apply it to a cut you will never feel the cut until it is healed.

While constructing the plant at Quarantine during the cholera epidemic of 1893, one of the engineers had his arm scalded so badly that the flesh was removed from the wrist to the shoulder. We saturated a cloth with the disinfectant and applied it to the scalded arm, and within two days after the application the wound was ready to receive the salve for the formation of a new skin. Every particle of inflammation and irritation had been removed, which would prove beyond question that this electrical disinfectant is not an irritant. But in its application for very sore throats, if you use it too strong, you will find the membrane somewhat irritated. There is need of some caution there: after using it one should stay out of draught for fifteen or twenty minutes, because if a little inflammation should be set up it would be aggravated by draughts. I have not in a year seen one case where it has been injurious, or where it has not been beneficial.

I will state, also, in passing, that in one of the letters of Dr. Cohen, of Philadelphia, he writes, "Did I notify you that my daughter had aborted a sty on the eye with electrozone?" That is my experience also. I had a sty about six months ago. I put some diluted electrozone on the eyelid over night, and in the morning there was no sign of sty or swelling.

Dr. Luckey.—Where and when can we get samples of electrozone to try it?

Mr. Woolf.—I gave some prepared for medicinal use to Dr. Brown, and he tells me he has used it. I will send him another supply, and if you gentlemen will call on him he will let you have it.

Dr. Luckey.—Can you give me your address?

Mr. Woolf.—I can give you my address, but I am a very busy man, and it would take trouble off my shoulders if you would send to Dr. Brown. We have not started to make the disinfectant for medicinal uses,—that is, it is not on the market for sale,—but I will send to you and your friends all you require for experimental

purposes; I will make up quite a little stock of it and send some of it to Dr. Brown.

Dr. Luckey.—I think this is a subject of such deep interest to us that I would like to know where we can obtain this electrozone for trial. If it proves as efficient in our work as it seems to have in other directions, it is the one thing that we have been waiting and longing for these many years, and that is the reason why I ask the question, When and where can we get it?

Mr. Woolf.—Dr. Brown will have all that you gentlemen can possibly use, and he will give you samples as fast as you want them for experimental purposes. I am sorry that I did not bring with me a copy of the *Dental Practitioner*, containing an article written by Dr. Bödecker—a gentleman whom I have never had the pleasure of meeting—on the benefits which his patients have received from the use of electrozone. In that article he cites different cases in which he used it, and states how he used it. I think it was written in the interests of your profession.

Dr. Barlow.—I understand this electrozone has been obtained at the S. S. White Dental Depot.

Mr. Woolf.—There is a possibility that that is so. Our agent has been out for some time, and he told me that this dental manufacturing company wanted some of the medicinal preparation, but I have been too busy to make it, and it is not on the market. I think the White Company has secured some that was manufactured for disinfecting purposes. I will say to those present that I feel myself to have been guilty of gross negligence in allowing that disinfectant to get on the market without having specially stated that it was not made for medicinal use. I feel that this has not been the fault of the S. S. White Dental Manufacturing Company.

Dr. Sanger.—What would be the effect of heat, as in a hot spray?

Mr. Woolf.—I think that if you were to heat it to boiling-point it would have an injurious effect. It is safe to heat it to blood-heat, but beyond that point there might be some chemical change,—just what, I do not know.

Dr. Sanger.—How would it act if used in a steam atomizer?

Mr. Woolf.—I think it is not necessary to use a steam atomizer. I think there are no objections to the use of the ordinary rubber atomizer.

Dr. Sanger.—Does it deteriorate by exposure to air?

Mr. Woolf.—But a trifle.

Dr. Sanger.—What is the effect of light?

Mr. Woolf.—I would always keep it away from bright light.

Dr. Sanger.—Would it have any effect on metal instruments, or be affected by them?

Mr. Woolf.—It would not affect instruments, unless they were left in it quite a little time.

Dr. Sanger.—Mr. President, I understand that Dr. Wright, of New York, has had some experience with electrozone. We would like to hear from him.

Dr. Wright.—I read the article of Dr. Bödecker, and have tried some of the suggestions he makes. I have used electrozone in the treatment of pericementitis and pyorrhœa alveolaris, and also in the treatment of dead teeth, and have been very successful. I should like to know what effect it would have if injected into an abscess.

Dr. G. Carleton Brown.—Mr. President, I believe Dr. Wilson has made some experiments with electrozone.

The President.—We would be pleased to hear from Dr. Wilson.

Dr. Wilson.—Mr. President, I have made some experiments, at the solicitation of Dr. Brown, not having any pecuniary interest in this electrozone, or any other interest except from a scientific stand-point. Dr. Brown called upon me two weeks ago and asked me if I would make some experiments with it. I told him I would be pleased to do so. I have found, in the first place, that it allayed the odor from putrefactive urine. I had some urine in the office for several days, and it became very offensive; I added a few drops of electrozone, and the odor entirely disappeared. I have also taken decomposed tissue and immersed it in this fluid, using it as a preservative fluid, and it preserved it perfectly. I have also made some bacteriological tests. I have here two culture-tubes. With this tube I took a solution of electrozone and swabbed out the interior of the tube, as well as the surface of the agar. Then I inoculated the tube with germs. I did the same with the other tube, not treating it with electrozone; then put it under similar circumstances,—favorable circumstances for propagation. That was last Friday afternoon. You see the germs, which have grown very rapidly in the tube in which electrozone was not used, while it has not appeared at all in the agar, in the tube in which the electrozone was used, showing that germs cannot exist in the presence of electrozone. This to me is a most practical test. While I am not yet satisfied with my experiments, I am glad to say that, so far as I know, this electrozone is a most perfect germicide.

Dr. George C. Brown.—Mr. President, since I have had this elec-

trozone in my office I have made an experiment in a case of sensitive enamel. The teeth were so sensitive as to render it almost impossible to touch them without the patient responding as though it were an exposed pulp, or something of that kind, it was so painful. I have been battling with that sensitive enamel for years; the lady has been a patient of mine ever since I came to Elizabeth, twelve or fourteen years ago. Without exception, she has the most sensitive enamel of any person I have ever met. She has come to me time after time with, as she supposed, a cavity in the teeth, and wanted it filled, and upon examination I have found no sign of decay whatever. She has been unable to eat anything very sweet or very sour. Shortly after I received the electrozone from Mr. Woolf this lady was in my office, and I said to her, "I have something here which I would like you to try; I don't know whether it will have any effect in your case, but if you will be kind enough to take it home and try it I would be obliged to you;" and I gave her a bottle of electrozone. Three or four weeks after that I received this letter:

SUMNER PLACE, October 31, 1894.

DR. BROWN:

DEAR SIR,—After trying the electrified sea-water faithfully, I am glad to tell you that I am eating figs without any discomfort from sensitive teeth. My teeth were so sensitive before that I could hardly believe it when you said there was no decay. Where can I get more of this wonderful sea-water, as my supply is nearly gone? I hope it will be sold cheaply, as I shall want it in generous quantities as long as I live, or until I get false teeth. Please let me know where it can be had, and the price, and oblige.

This lady is the wife of one of the professors in Rutgers College. I had no idea when I gave her the preparation that it would have any effect; I gave it to her as an experiment, and I give you the result. I saw her husband on Thursday afternoon, and he said she was perfectly comfortable, and had no return of the trouble.

(Vice-President Richards takes the chair.)

Dr. Sanger.—Mr. President, I move you that a vote of thanks be tendered to Mr. Woolf for his kindness in coming here and presenting to us this very interesting subject.

Dr. Sanger's motion was carried.

Dr. G. Carleton Brown.—I believe there are a number of gentlemen present who have had samples of this electrozone and have experimented with it. I think Dr. Meeker said he has used it successfully in a case of perforated antrum.

Dr. Meeker.—Mr. President, through the courtesy of Dr. Brown, I was presented with a bottle of electrozone, and, after reading the

article in the *Dental Practitioner*, written by Dr. Bödecker, I tried electrozone on some dead pulps,—cases where I removed the pulps and filled at once. I think I have performed about ten operations of that kind since I have had the electrozone, and, on the strength of Dr. Bödecker's article, I filled immediately, and there has been no subsequent trouble, although I was, of course, fearful of it in each case. Last week I had a case of perforation of the antrum under the twelfth-year superior molar. I enlarged the canal. The lady complained of pus dropping in her throat from the fauces at night when reclining in bed. I opened up from the centre, and found that the pulp was dead. I went to the end of the palatine root, finding considerable pus there. I took an abscess-syringe and syringed with electrozone, full strength, into the antrum. The lady complained of a little pain at the time. I stopped the cavity with bibulous paper and told her to come the next day. I did not see anything of her until Saturday. She then said she had not had any further trouble, and so thought it was not necessary to come to me. On Saturday I removed the bibulous paper and entered the antrum. I found spiculæ of bone there, and I concluded there was slight necrosis. The pus had stopped flowing entirely, and she had had no trouble with the throat. That was to me a very good test of the benefit of electrozone as a powerful antiseptic. I would not have dared to use five-per-cent. pyrozone in that way.

Dr. Barlow.—I received a bottle of electrozone, and I tried it in about the same manner as Dr. Meeker has stated. I have filled several teeth, after cleaning out the pulp-canals and using electrozone in them. Saturday afternoon a lady came to me, through a physician, bringing a child eight years of age, the child having a sixth-year molar which a dentist had attempted to remove two or three years ago, just after it erupted, and from that time up to the present there had been a discharge from the external part of the tooth. There has been a running abscess ever since. The child is still under the care of the physician, and he told her on Saturday that he did not know whether there was a root there causing the trouble or whether there was necrosis, and she had better come to a dentist in reference to it. I took a probe and entered it, and I thought I detected a root. I syringed it with electrozone, full strength, washing it out thoroughly two or three times, pumping the electrozone into it. Pus flowed out very freely. I told her to come back this morning. She came about nine o'clock, and she said, "Doctor, that child has not had so little pain for the past month as she has had since you injected that medicine." I told her

I thought there was a root there. I was quite certain there was part of a root left, and probably some necrosis. I made no further attempt; I did not want to take the case out of the doctor's hands, so I told her to report to him. She said the child had had less pain since Saturday afternoon, when I treated the abscess with electrozone.

Dr. Sanger.—Mr. President, I received a bottle of this electrozone, through the courtesy of Dr. Brown, about a week or ten days ago, and the first case I tried it on was one of those pulp-canals such as you are all familiar with; it filled the operating-room with its odor. I treated that canal, removing the pulp, and swabbing out the canal thoroughly. I then introduced a broach with clean cotton, and the only odor that I could detect was that of chlorine. The thought that came to my mind was chloride of lime; I did not think at first what it was. The purifying of the canal seemed to be perfect. I afterwards introduced the Evans root-dryer, hot, and I failed to detect the customary odor that comes when you first withdraw the hot dryer from the canal and put it into the flame. That led me to believe that that canal at least was thoroughly purified, and I filled at once, without any trouble so far. I am still experimenting with the remedy, and I expect great results.

Vice-President Richards.—Are there any others who wish to report on this subject? I believe quite a number of our members have received samples of electrozone from Dr. Brown.

Dr. George C. Brown.—If any of those present would like to try this remedy, and they will drop me a line, when I receive a supply from Mr. Woolf, I shall be happy to send them some.

Dr. Wilson.—I would like to say that, as regards its action upon mucous membranes, I have not had sufficient experience to speak very positively; but I am now experimenting upon some traumatic conditions of the nasal mucous membrane, and thus far it has worked beautifully. I do not believe, however, that this substance is a cure-all. There are certain conditions of the mucous membrane that it does not irritate. In some cases it acts as a stimulant.

Mr. Woolf.—Mr. President, I cannot refrain from expressing my thanks to those present for the patient attention they have given to my presentation of this subject and the courtesy they have shown me this evening, and I wish to publicly acknowledge my debt of gratitude.

Dr. Meeker.—Mr. President, I am glad to say that Mr. Woolf has just consented to read a paper before the State Society at the

August meeting. We expect at that meeting about eight hundred dentists, coming from all parts of the United States, and some from foreign countries. The New Jersey State Society and the National Association will meet in the same week at Asbury Park. The auditorium has been engaged for the occasion, and there will be ten chairs and thirty clinicians. It will be one of the grandest dental meetings ever held in this country.

Vice-President Richards.—Gentlemen, I have received a bottle of this electrozone, and I applied it to an aching tooth, not expecting any benefit, but the lady said the tooth did not ache after she went out of the office. It stopped the toothache immediately, and the lady was nearly frantic when she came in. You can take that for what it is worth.

Dr. G. Carleton Brown.—I want to speak of the action of this remedy in a case of a class which has not been touched upon here to-night. Two weeks ago a gentleman came in, suffering from peristitis. He had some bridge-work in his mouth, and the roots it was anchored to indicated violent irritation. I did not know exactly what to do, so I thought I would try electrozone. I saturated some cotton with it and put it on the roots, with the result that he left the house feeling perfectly comfortable; had no pain whatever. He is a writer on a paper in Syracuse, and he sent me a paper the other day with a long editorial on the wonderful effects of electrozone, so I suppose the cure was permanent.

Editorial.

POLITICS IN DENTAL ASSOCIATIONS.

It will, perhaps, ever remain a difficult matter to arrange professional societies without more or less friction. As long as human nature remains as it is, with its varied and oftentimes discordant elements, it will be difficult, if not impossible, to harmonize antagonistic forces and place these bodies independent of political influence. It must be conceded that inasmuch as professions are, or should be, based on altruistic motives of action, seeking the greatest good possible to suffering humanity, they should eliminate all selfish considerations.

Unfortunately, while this is the true basis of all professional work, whether in the individual or in a collective capacity, there is an ever-increasing tendency to use the good for selfish ends.

Dental organizations, following the custom of the medical and other societies, have generally based their organic laws upon a principle that invites, sooner or later, to caucus work, combining for the overthrow of those in power, that another clique may gain supremacy.

While the members of an organization remain in harmonious relations, the old form of constitution, with its list of president, vice-president, secretary, etc., answers an excellent purpose: but it has been abundantly demonstrated, in and out of professional work, that this is but temporary, and in the course of time personal aspirations for the highest offices, or, what may be considered worse, the desire to overthrow the ruling body, brings about a conflict, and the organization is given over to political interests and political methods, which eventually injures the usefulness of the society and possibly ends in its destruction.

The American Dental Association was a sufferer for years from this infliction, and in degree is still weakened by it. The presidency was to many more important than the work the members met to accomplish, and long anterior to the annual gathering more attention was paid by opposing forces to securing the coveted prize than to scientific work needed to make the meeting of permanent value. Who of the members cannot recall the scenes that annually occurred at these gatherings? So much was this resorted to that a majority of the members finally became convinced that this evil influence must be destroyed root and branch, and a committee was appointed to prepare a constitution that would make politics an impossibility. When this new constitution becomes operative it is hoped that the American Dental Association will have heard the last of political cabals, and that members will meet together for purely professional work.

While the future promises well for this organization, its previous example has worked a serious injury to related and subordinate bodies. We have not the constitutions of the various societies by us for reference, but it is presumed very few have anything in their organic laws that antagonizes this baleful influence. From the reports that come to us, here and there, of societies broken up, or, to use the political word, "captured," it is inferred that most of those composing these bodies have not yet reached the advanced position taken by medical men on this question.

Very recently the College of Physicians in Philadelphia was the scene of a similar effort of a very mild character compared to that frequently seen in dental organizations. Officers were to be elected, and one over-zealous individual wrote a letter to various Fellows advocating the election of a prominent member. The tactics of the gentleman were exposed, and the candidate was defeated, and a strong probability is entertained that the result will be the expulsion of the member who sought to attain his end by political measures. This is stated simply to show that the professional feeling in medical circles is positively antagonistic to any such methods. There can be no reason why the same feeling should not be maintained in the dental profession.

There is only one way, it seems to the writer, to meet this deep-seated poison in the professional body, and that is to make an entire change in the organic laws. One society, recently organized, has taken the election of officers almost entirely out of the hands of the main body. The members have the privilege of nominating a certain number for each office, and from these the council must select one. It is hoped by this method, similar, we believe, to that in force in the National Medical Association, that the disturbing element of politics will be entirely eradicated. There are some objections to this mode of doing business, as its tendency is to a centralization of power and a partial deprivation of the individual right of expression, so dear to the average American; but some sacrifices must be made for the good of the whole, and this plan has less of evil in it than that ordinarily adopted.

If we can rid our organizations of this political tendency, we may attempt other reforms; but while men who are working solely for the advancement of the profession, and care nothing for so-called posts of honor, are constantly to be confronted with political warfare, they will lose interest and decline to take an active part. It is for this reason, it is surmised, that some of the best men in dentistry rarely or never are seen at the annual gatherings, preferring to do their work in their own local organizations. A total change must be made in this direction, or the result will be that new organizations will spring up in which only those can enter who are willing to lay aside all selfish aspirations and work solely for the true advancement of the associations in scientific knowledge, and not for the ephemeral glorification of the individual.

THE DENTAL DIGEST.

This new journal, as its title-page indicates, is to be "A Monthly Summary of Dental Science devoted to the Progress of Dentistry." It will be the official organ of the "Dental Protective Association of the United States" and also the "Dental Protective Supply Company" of Chicago.

It is presumed it has editors, as its sixty-four pages indicate labor in preparation, but no names are announced as conductors. The January issue, Vol. I., No. 1, is as a whole an interesting number and well prepared. The illustrations leave much to be desired, especially those of the American Dental Society of Europe. They are certainly not self-explaining.

The "Digests," prepared, it is presumed, by Dr. Crouse, make a very readable *résumé* of various society reports, but it is doubtful whether readers will gain much from a paragraph taken here and there as a substitute for an entire paper.

We wish our contemporary success in its chosen field.

THE SOUVENIR VOLUME OF THE WELLS CELEBRATION.

THE chairman of the committee having this report in charge announces on another page that he is ready to receive subscriptions. Those interested in this memorial volume should address Dr. J. D. Thomas, 912 Walnut Street, Philadelphia.

PROOF-READER GONE WRONG.

OUR good friend the editor of the *Dominion Dental Journal* must have been absent from the sanctum when the December number was in preparation, or he would not have permitted the reader to give credit of authorship of "The New Era in Dental Practice," published in the September number of this journal, to "Professor Flagg, of Philadelphia." We have too much of an ever-present fear before us of errors to complain seriously, and would not disturb our serenity over this; but we feel regret that our contemporary should cast on the shoulders of the great apostle of the "New Departure" the burden of the mantle of the prophet of the "New Era," with all its possibilities.

To those inclined to follow the example of the *New Dominion Journal* and copy the article, they will confer a favor by giving credit to Dr. W. G. A. Bonwill, of Philadelphia.

Domestic Correspondence.

REPLY TO DR. MAX GREENBAUM.

TO THE EDITOR:

DEAR SIR,—I find in recent issues of your valued journal two articles by Max Greenbaum, D.D.S., of Philadelphia, which purport to be a reply to a paper of mine on "Coagulants in the Treatment of the Pulp-Chambers and Canals," published in the *Dental Cosmos* for March, this year. I have spent some time and careful study in trying to discover just what my critic is endeavoring to establish. He has evidently demolished, to his entire satisfaction, several propositions which he has himself set up for the purpose, but that they have any existence in my paper, or anywhere outside of his own imagination, I challenge him, or any one else, to show. He has assumed that my research was intended to demonstrate the superiority of certain antiseptic coagulants over others in the treatment of root-canals. In support of this statement I quote from his paper in the *INTERNATIONAL DENTAL JOURNAL* for November, page 706, as follows: "*The position taken by Dr. Kirk in his recent article has, we believe, been shown to be far from convincing, and far from its purpose to disprove the assertion that such coagulants as carbolic acid or zinc chloride are detrimental when employed in canal work.*" I never had any such purpose, and distinctly disavowed it in the article he criticises. In support of which assertion I quote from my article the following statement of the problem which I proposed to investigate:

"The objection which is made to the use of coagulants by those who condemn them in this connection is, as nearly as I have been able to ascertain, based upon the assumption—for I regard it as such—that when introduced into a pulp-chamber their action is to superficially seal the dentinal tubuli by forming an impenetrable coagulum with the orificial end of their albuminoid contents. This is believed to produce the two-fold result of preventing the further entrance of the coagulant or any other antiseptic, and also of hermetically enclosing within the tubular structure of the dentine a

certain quantity of non-sterilized or infected organic matter, which may, by its decomposition, act subsequently as an irritant to the pericemental membrane. If the major premise of this assumption be a correct statement of the actual conditions, then we must admit the corollaries as deduced from it; but in so doing we necessarily admit that our best-known and most generally used antiseptics in the treatment of pulp-canals—viz., carbolic acid, zinc chloride, and corrosive sublimate—do not penetrate the dentine structure, and consequently sterilize only a superficial film of organic matter lining the pulp-chamber and canals. The long clinical record in favor of the substances named would seem to indicate that their action in the pulp-canal is something more than a superficial action, and that their penetrating power is not self-limited because of the coagulating property which is common to each. It is my purpose to call attention to what I believe to be a serious error in this reasoning, which has led to the somewhat general condemnation of coagulants in pulp-canal treatment, and to present the bases for my belief that the coagulating property is not *per se* a sufficient reason for their disuse; or, stated otherwise, if they are unsuited for the purpose of pulp-canal treatment, it must be for other reasons than that they are coagulants. . . .

“I do not wish to be understood as favoring the indiscriminate use of these substances, for they possess individual characteristic properties and effects which may rightfully exclude their usage under certain conditions. What I wish to emphasize is that their coagulating property cannot be scientifically or clinically urged as an objection against their proper use.”

The problem which I had under consideration was a problem of physics, not one of therapeutics, and it would seem reasonable that any one of average intelligence and a fair capacity for understanding the meaning of English words would have gathered that idea from reading the article in question. Dr. Greenbaum announces as a new fact, presumably the result of his own investigations, that “We found different coagulants act in different degrees as relates to power of coagulation, the different coagula showing a marked difference in structure.” This observation deserves respect because of its antiquity. It is not quite so haggard as the Wandering Jew, but it is at least venerable on account of its age. In this connection I would suggest that if he will pursue his investigations a little further, he will find that carbolic acid, zinc chloride, and corrosive sublimate will have their coagulating power modified in degree proportionate to the strength of solution in which they are used.

By following this up for a while he will be able to produce coagula exactly analogous to those which he gets from campho-phénique (which depends for its coagulating action on the carbolic acid, which is its most prominent antiseptic constituent), oil of cloves, or oil of cinnamon. In neither of his critical effusions has the writer touched upon the only point of issue in my article,—viz., the self-limiting character of coagulated albumen,—excepting when he says, “and we may find, furthermore, that albumen coagulated solidly, such as results from the action of carbolic acid or zinc chloride, admits of no extended penetration of a second application, unless such application remained in contact in excessive quantity with the coagulum for two days or more. In dental work this is not admissible.” This is really to the point, and would be interesting if it were true. The writer does not seem to be quite sure of his position, inasmuch as his statement is couched in the protective covering of the subjunctive mood. Now, if he will read carefully once more the article which he has criticised, he will find recorded there experiments intended to determine this very point. Let me, however, state for his further enlightenment that solid coagula, three-sixteenths of an inch thick, made with albumen and zinc chloride in saturated solution, permitted the passage of mercuric chloride solution in forty-five minutes. Dr. Greenbaum is quite at liberty to draw his own conclusions as to the applicability of these data to practical dental therapeutics; in fact, it was for gaining more accurate knowledge in this direction that the physical problem of osmosis through coagula was investigated by me. My critic, instead of showing errors of observation or deduction in my paper, has wasted effort and valuable space in a dental journal in attempting to explode propositions of his own manufacture. His energy would, I think, have been better expended in a careful study of the paper which he criticises. It might have helped him to a better understanding of a subject which, if his treatment of it is an indication, he is most profoundly in need of. His own position in this matter he characterizes as “scientific,” and, by implication at least, that set forth by his opponent as “unscientific.” I submit, Mr. Editor, that his recent writings furnish evidence of the fact that he either has only a very vague idea, or none at all, of the content of the term scientific, or that his language does not express his ideas. In support of the former proposition I offer as proof his article, “The One Material,” *INTERNATIONAL DENTAL JOURNAL*, September, 1894, and of the latter, the closing sentence in the November issue, as follows: “The statements of laws of any scientific

knowledge are the statements of laws of scientific dentistry, and thus it advances to the position of a true science." Just what form of paranoia has attacked my critic I am unable to diagnose, but its two most prominent symptoms seem to be an acute logorrhœa accompanied with intellectual tenesmus. Logorrhœa you will not find in the dictionary, but it is derived from *logos*, word; the remainder of the derivation will be self-evident.

EDWARD C. KIRK.

November 7, 1894.

ADDITIONS TO DR. POTTER'S PAPER.

TO THE EDITOR:

SIR,—In my article entitled "Some Details as to the Care of Instruments," appearing in the December, 1894, number of the INTERNATIONAL DENTAL JOURNAL, I make the statement that carbonate of soda was substituted for potassic hydrate in my system of sterilizing because cheaper and equally effective. I have, however, found specimens of carbonate of soda which were not satisfactory, because they did not keep steel instruments from rusting while being sterilized. And I have returned to my original plan of using a potassic hydrate solution for the prevention of rust. I use two or three drachms of the liquor potassæ of the Pharmacopœia in a pint of water. Instead of using a zinc tray inside of the sterilizer, as described in my article, I am now using a porcelain enamelled iron dish such as is made for cooking purposes. This porcelain enamelled dish I find keeps the instruments in better condition than a metallic tray. For thorough sterilization instruments should be kept at 100° centigrade, moist heat, for over thirty minutes. It is my practice to leave instruments in the sterilizer about one hour.

WILLIAM H. POTTER, D.M.D.

BOSTON, January 16, 1895.

Current News.

SOUVENIR VOLUME OF THE WELLS CELEBRATION.

THE chairman of the Executive Committee of the Horace Wells Fiftieth Anniversary Celebration announces that the papers read by Professors Fillebrown and Garretson at the meeting, and the

speeches delivered at the banquet have been prepared for publication in the proposed souvenir volume, and will be issued upon the receipt of a sufficient number of subscriptions to cover the expense. Price \$1.50. The undersigned will receive subscriptions, receipt for same, and deliver the book upon completion.

J. D. THOMAS,

Chairman.

912 WALNUT STREET, PHILADELPHIA.

Selections.

A NEW METHOD OF REDUCING DISLOCATION OF THE JAW.

DR. ROTH seats the patient in an ordinary chair, and stands before him with one foot placed slightly to the right side and the other just in front of the patient and in the middle line. He then flexes himself at the hips and causes the patient to lean forward and to place his forehead at the middle of the operator's sternum, —but this position varies with the size of the patient's head. The operator now flexes his neck so that his chin grips the patient's head about the upper part of the occipital bone, thus acquiring a firm hold with the head well under control between his chin and chest. Now the thumbs, protected in the usual manner, are placed in the patient's mouth, and the fingers of both hands grasp the lower jaw.—*The Medical Age.*

THE International Dental Journal.

VOL. XVI.

MARCH, 1895.

No. 3.

Original Communications.¹

MODERATION IN PRACTICE AND IN STATEMENT.²

BY SAFFORD G. PERRY, D.D.S., NEW YORK CITY.

At the last meeting of this Society, Dr. Jarvie made some very timely remarks on the subject of moderation in practice and moderation in statement of professional experience and opinion.

The lateness of the hour prevented me from expressing approval of his opinions and of adding some thoughts of my own on the same general subject.

Taking his happy expression "moderation" as a text, I would like now, in a rambling sort of way, to express some thoughts which I trust will not be considered too self-assertive, but rather as suggestive to those who care for the real advancement of our calling in all that makes it worthy to be considered a relatively exact and therefore scientific profession.

In the beginning, however, I will say something on the subject of accuracy of observation and expression, and later something on the subject of moderation in practice.

If I commence with a plea for higher scientific attainments, I

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read at a meeting of the New York Odontological Society, November 20, 1894.

shall be only following in the footsteps of many who have talked and written on the subject of dental education and of the means for the elevation of our profession ; and I shall expect you to be weary at the outset, for have we not all grown tired of the subject in all its different bearings, and are we not all longing for some new statement of the old story, if we must have any statement of it at all ?

If the truth were told, I think we are all unconsciously waiting for some new and more practical way of helping our profession to a higher place, and I venture to suggest that, instead of talking so much about dental education and the training of the young, it would not be out of place if we, who are older, should inspect a little more carefully our own careless methods, and should endeavor to correct and perfect them, so that if we are looked to as examples by the young we may show that, in a new profession in which there must of necessity be much self-education, we have done something, at least, to encourage the scientific spirit, and in doing that, have done the most we can do in our several ways for a profession with which we are so closely linked that we must rise or fall with it as the case may be.

We are weary to the last point of endurance of being told that we are a very scientific body of men, and that our profession is a very exact one. We are tired of being told this, because deep down in our inner consciousness we know it is not true.

In the strict sense of the term we are not very exact in our practice and we are not very exact in the tabulation and report of our experience.

The best proof of this is shown by the fact that in our discussions a statement made, that a certain line of practice is the best known, is often met at once by another statement that the opposite is true.

As both cannot be true, the natural conclusion is that the real truth is somewhere between the two extremes, but we cannot tell just where, and in trying to adjust the sliding scale we finally comprehend the fact that we are not dealing with the exact truth itself at all, but with individual opinions of it, even our own opinion.

Of course there are certain fundamental facts on which our practice rests. For instance, we know the certain action of a few drugs, but we use many more the ultimate action of which we know very little.

We know that under certain conditions certain filling-materials, properly used, have the power to arrest decay of the teeth, but we

also know that the same materials, improperly used, or under certain other unfavorable conditions, do not save the teeth for any length of time.

It will be seen, then, that our practice cannot be strictly scientific; but it will be successful in proportion as we apply to it such scientific rules as we are able to master. If we are close observers, and have hand-craft, we may become good practitioners. If we are careless in the observation of facts and hasty in our application of them, we are sure to become uneven and untrustworthy in our practice, even though we may have skilful fingers.

In other words, our personality determines largely the character of our practice.

This is all elementary, and need not be stated, but for the fact that I want to emphasize the importance of what the astronomers call the "personal equation," and to show how largely we are influenced by it in the formation of our opinions, even without suspecting it ourselves.

If, in a science so exact as astronomy, allowance is always made for the personal equation, how much more must it be allowed for in a science so inexact as dentistry is, and must always be.

So exact is astronomy that a slight personal aberration in observing and reporting the stars is quickly detected, but in dentistry, which is so inexact, the wildest personal aberrations sometimes go unnoticed and unrebuked.

To eliminate as far as possible the personal equation is a requirement of the first importance, if we are to lead the scientific life.

Confucius insisted upon the acquirement of exact knowledge. He likened imperfect knowledge to a chair with four legs, one of which was broken. "You sit unevenly," he stated, "on such a chair."

Science is concerned with facts, not fancies, and he who can discover the facts and not be influenced by the fancies is the man whose influence will be felt most in the department of science in which he works.

The application of this general proposition to our own profession brings me to the point of repeating that, instead of harping forever about dental education and the elevation of the profession, it seems to me that it would be more becoming and more effective if, after becoming certain of our facts, we adopt the cold, careful, accurate language of science in describing them.

Our literature would then not be so full of wild statements of opinions hysterically expressed.

Exaggeration of statement is a common fault among men and women as we meet them in the world.

Our whole educational system is such, covering, as it does, so vast a range that we are unconsciously careless in our thinking, and naturally we become inaccurate in our habit of statement.

This may be overlooked in the affairs of the world ; in fact, there, if people are too accurate, they become a sort of terror, and are called too prim and too precise.

But in the scientific world looseness of thinking and speaking is not permitted, and yet, in our profession it is common because we have not yet thrown off our early habits, and have not yet adopted the accuracy expected of those who lead the scientific life.

The scientific man must also be on his guard against a certain kind of imagination inherent in us all, and which is peculiar to childhood, and not easily outgrown. It is well illustrated by the story of the fisherman, who said the fish he saw swimming towards his hook was a foot long ; while pulling him out he thought he must be two feet long, and when he got home and told about it he declared he was three feet long. His unprejudiced friends measured the monster and found him not six inches long. Elated by his day's sport and the champagne of the woods and fields, the fisherman doubtless believed in a misty sort of way that he told the truth.

Men use some new form of gold or amalgam, or gutta-percha or cement, and, charmed by the novelty, they believe and affirm that it is a fish three feet long. And some have the exuberant and hopeful temperament that leads them to think it is a whale!

After a time it shrinks in their estimation and they throw it back and wait for another bite.

The same exaggeration is shown when a runaway horse dashes down the street, and six of the ten spectators say that the carriage-wheels came within two inches of the lamp-post. Careful measurement of the track made by the wheels would probably show that it did not come within two feet of ruin and destruction.

Some men assert and believe that they never have trouble with dead teeth. If their memories could be jogged, and the truth known, it is not unlikely that they have come near having dead patients.

In the same way they assert that in a case of periosteal disturbance they control the inflammation by the use of so and so, which acts upon the circulation in such and such a manner. Aside from the distraction of the nerve-currents caused by the use of counter-

irritants, what effect could they produce upon the "bugs" swarming around the end of the root of the sore tooth by any remedies applied to the gums?

The Irishman said he could doctor himself, for he put some stuff on his boil and in a week or so it got well.

Words are the tools of the mind. A man with a well-equipped mind is like a carpenter with a good set of tools, which he takes with him, and with which he can work at any time and in any place.

If he is a poet, and is being consumed by some internal canker, his words will be a reflex of his inward pain, and the artist's brush, when he paints, will make a streak of lurid red.

If he is a philosopher, or thinks he is, his words will be ponderous and elephantine and soporific, even to the point of producing a condition, to use his own phrase, of innocuous desuetude, and his Latin terms will be bigger and longer than the things he describes; and his listeners will gape with wonder or fatigue, as the case may be.

If he is a crank, he will be like a hand-organ, which, when wound up, always plays the same tune.

But if he has the scientific training and spirit, his words will be few but to the point. He will say exactly what he means and mean exactly what he says.

My allusion to the carpenter doubtless made you think of the term as applied to the botch dentist. I think it can equally well be applied to some men who are extremely skilful. Their fingers are so nimble, their touch so accurate, and their tools so good that they are forever carpentering away at the teeth, showing what can be done, and how well they can do it. They seek unusual operations, and perform them with a great blowing of trumpets and beating of drums. They exaggerate the importance of their handicraft, and confine themselves within such a narrow range that they lose the larger, wider view, and fail to comprehend the significance of proper dental care, considered in its best and widest sense.

For the tooth-carpenter I would substitute the dental "nurse." You smile at this, as it may suggest to you a society of old grannies, with clumsy hands and feeble brains, but I intend no joke. It is a term I have never seen or heard, but to my mind it expresses an idea that probably will not be appreciated except by those who have had long experience, and have stood by and seen the teeth erupt and develop, and seen them decay and loosen, and have come to know that in the human mouth natural laws that cannot be set

aside are at work, and that about all that can be done after all is to nurse and help and conserve.

I recently picked out from the gum a loose molar top-heavy, with a three-hour gold filling that had been put in only three or four years ago, in a beautiful manner by an "operator."

An oxyphosphate filling matched to the color of the tooth, and put in in ten minutes, and renewed three times at the most, with five minutes for each renewal, and a trifling cost for the whole, would have given as good results, so far as usefulness was concerned, and a better result in appearance.

A dental "nurse," with a level head, would have recognized the condition of the mouth, and would have known at once that the tooth could not be retained but a few years at the most, and would have acted accordingly.

There can be no argument made against the nimble fingers that can produce perfect work in all places when perfect work is really required.

There are some teeth so hard to save that human fingers were never yet equal to the task, and so valuable that time and money should and would not be considered for a moment, if they could be saved.

Then the cap and gown of the "nurse," with all the gentleness and good nature that goes with them, must be put aside, and the armor of the "operator" put on, with all the firmness that must ever accompany it.

In addition to rather careless habits of statement, and of not very level-headed practice, there exists in our profession a certain kind of inattention, on the part of many of our good men, and also with some other equally good men, there exists an unconscious intolerance of all ideas and modes of practice that are not in accordance with those they have adopted. This inattention is so wide-spread that any one who ventures to express an opinion, or to describe a certain line of practice, must do so at the risk of being misunderstood, even though he may use the most exact words in our language.

I have experienced this myself many times, but never more markedly than after the publication, last winter, of a paper on the care of young teeth, for which I advocated the plastics, *under certain conditions*, and received the credit, in some quarters, of believing in them not only for all young teeth, but for all teeth.

I have since looked that paper over and I have failed to see how I could have stated any more clearly my faith in gold for

teeth of good quality, under favorable conditions, even in young teeth.

The intolerance of which I speak is a trait of our common humanity, and comes down to us through many generations.

It has been shown most, perhaps, in the religious world, but it exists in our profession, as it does in all professions, and it will continue to do so far beyond our time.

One who does not use the plastics will continue to be impatient with one who does, and one who never uses amalgam will pity or abuse the one who has the courage to admit that he sometimes depends upon it. And so on through the whole list.

It requires courage to face the danger of being misunderstood, and it needs patience to bear the scorn of intolerance, but, believing in plastics, under certain conditions, and publicly advocating them requires more courage still, for it puts a weapon into the hands of those who hate you, or those who are jealous of you. But the man who has convictions and lives up to them, must expect to "get it in the neck," anyhow.

It is worth something, however, to be free, and I honor the man who can use plastics in places where he thinks they are called for, without thought of the effect on his reputation.

Dr. Jarvie's phrase "moderation" exactly expresses the need in the dental profession to-day.

Facts, carefully observed and clearly and tersely stated, have great value to earnest seekers after truth in a field where there must always exist to some extent conjecture and uncertainty.

Opinions of those who have had long experience also have great value, but a man's opinions must not be confounded with his facts.

The facts he reports speak for themselves, and are of value as they are clear and plain, and the reverse, as they become vague and shadowy.

But the value of his opinions will depend upon the combination of mental faculties that make up what we call a level head.

If his opinions are to have value, he must show that he sees things as they are, and not as they seem to be, and he must have the power of justly estimating the importance of his facts, and of putting them all in proper relation to each other.

In other words, he must have "horse sense," which is after all only a high order of common sense.

If he has the true scientific spirit, he will be sincere, and being sincere, he will be poised and serene.

He will become so absorbed with his facts that he will forget himself.

His personality will be blotted out, and that which persists will be his array of facts. They can never be destroyed; if they can be, they are not facts!

Without suspecting it he will become unselfish.

We are generally expected to explore the religious world for examples of unselfishness, but I doubt if we ever yet saw a more perfect example of an unselfish man than one who is a true follower of science in the fullest meaning of that term.

He can have no mental struggles, for wherever science leads he must follow.

As he pushes his way into the unknown, acquiring a knowledge of new facts, and discarding his errors, his life becomes a constant going back upon himself, but he has no regrets, for a single new truth outweighs all his old errors.

If this new truth proves a delusion, it will be equally willingly given up.

If he can give to the world a new fact and get the credit for it, he is happy.

If he does not get the credit for it, he is still happy, because the world has got the fact!

If you say, this is ideal, the reply is, that a man who is full of the love of science is full of the love of truth, and a man who is full of the love of truth has a religion that embodies the most perfect ideal.

If he is a dentist and invents some new device, or discovers some way by which his patients and his fellow-practitioners can be benefited, he is happy whether he gets the credit for it or not.

If he puts in a fine filling, he can be content if it is never seen and admired.

If the patient dies, his first thought will not be, "another show-filling gone!"

On the other hand, if the conditions are such that he has to put in a poor one, or such that he thinks he had better put in a poor one, he will be equally indifferent and undisturbed if the filling is seen and condemned.

His love of science will be so strong that his only concern will be to do the true thing, and the true thing will be the right one, and in doing this he will show that he has the level head before mentioned.

And the chances are that the true and right thing will be the moderate one.

In making the practical application of this principle, he will be reminded of his boyhood's copy-book, in which he wrote, "Moderation in all things."

In dental practice he will not use gold exclusively; on the other hand, he will not assert without a qualifying phrase that it is a failure.

He will not use the plastics without regard to the age of the patient—first and second childhood—and the condition of the teeth, and as he grows old himself he will be on his guard against them because they are easy to use.

This danger is an insidious one, and may creep on an elderly man as stealthily as the years have done. We have all doubtless heard gutta-percha called the "old man's filling-material."

There is great danger from plastics, because they are so easily used, and particularly with men who have to submit to the tyranny of large practices, and who have to use them constantly for temporary purposes.

They do so well that it is easy to slip into the habit of using them more generally, and now and then the pendulum quite unconsciously may swing too far the other way.

If moderation were observed it would not swing at all, but would hang balanced between the two extremes.

If our imaginary dentist is young, but desires to be wise, he will be on his guard against the universal over-confidence of youth.

Though the vigor in his blood may make the unattainable seem easy, his mind will be full of interrogation-points, and an introspective habit will save him from making endless mistakes.

He will be careful about the extraction of the sixth-year molars, because some "big-wig" has said they must come out, and he will be slow in undertaking the regulation of teeth that in a few years will regulate themselves.

He will not get frightened out of his wits and lose heart because the teeth of some young patients are soft and seem to be on the verge of destruction, but he will brace up and plaster them up in the best way possible, knowing that a few years will work wonders in the improvement of their condition. He will not lie awake at night and worry about articulation, and decide to build up or down with gold teeth that will be articulated sufficiently for all practical purposes in nature's own way in a few years.

He will remember that millions of men whose teeth were badly articulated have lived long and useful lives; and millions more, in their day and generation, have fulfilled their mission without any

teeth at all in their old age! Even George Washington was toothless, and who will say that he lived in vain?

I say that he was toothless, for who that ever saw the numberless masses of carved bone that he is said to have worn would consider them teeth?

I suppose it must be believed that he did wear them all, such as they were, for he could not tell a lie about them; and if *he* could not and did not, it is only reasonable to think that no one else would care to.

I am not aware that history has ever told us why he could not tell a lie.

Perhaps it was because his articulation was so bad. I think these carved bones that we see in museums, as well as in the hands of private collectors, might afford an important clew to the historian. There must have been some such natural impediment, for without it it is hard to believe that a man of his force of character could not tell a lie.

Our young professional friend, desiring to be wise early, will be very slow to condemn as bad practice that which does not conform to his own opinions, and he will not be very ready to say that a certain piece of work was done badly, when he knows little or nothing of the conditions under which it was done.

He will be fortunate if he has the faculty, which is rare indeed, of watching for and profiting by the experience of those who have gone over the course before him.

Wisdom cannot be put on and off as one's coat. It is a slow growth. It has been truly said that by the time men are old enough to know how to live they have to die.

By the time a man has seen a set of teeth develop from early childhood to adult life, and has noted all the changes that occur during that time, he may be ready to practise dentistry wisely in its widest sense, though by that time he may have lost the pliant body that made the performance of difficult operations in cramped positions comparatively easy.

It has often been said of the women who have played Juliet that by the time they were old enough to comprehend the deep significance of the character they were too old to invest it with that sweet quality of girlhood that is always its greatest charm.

But age and experience, even, may not always bring wisdom, for there may be lacking that combination of faculties that makes up what I have called the level head.

This imaginary dentist of whom I speak will, without regard to

his age at this time in our profession, find ample need in various ways for the exercise of that moderation of which Dr. Jarvie speaks.

He will be in danger of being led away by the vagaries of bridge-work.

He will find many of his professional brethren gone mad upon that subject, and, caught by the current, he may be swept along and carried out to sea, where, tossing about on the uncertain waters, he may comprehend what good, solid land he has drifted away from.

He may grind down and partially destroy good natural teeth, in order to put in one or two artificial ones which cannot be removed and cannot be kept clean, and which the patient for years had gone without, and yet had not been made specially conscious of their loss.

He may forget that before he was born teeth attached to skeleton plates were put in and held firmly and comfortably, being attached by clasps in such a way as not to injure the natural teeth, and yet so as to allow removal for cleansing or repairs.

He may not perceive that the natural teeth rest in a cushioned socket that allows a little play, and that when his immovable bridge is cemented fast the teeth are held in an immovable manner, nowhere duplicated by nature.

The bridge may eventually come out, but when it does the teeth may come out with it.

If this is considered an extreme statement, my reply is, that I have seen it occur so many times that I consider it should be taken into account as an important factor.

I have taken out a great many immovable bridges; though I have never yet taken one out without being first requested by the patient to do so, for I try to avoid prejudice against this, as against all other special lines of practice. There is no intention in this to condemn removable bridge-work. That is only a modified and greatly improved form of applying an old fashioned skeleton-plate fastened with clasps. In the matter of gold crowns our professional artist may follow the fashion of the day, and use them so near the front of the mouth that his patient's speech will be gold, and even his silence golden.

Perhaps it is a good advertisement, and leads some people to say, "Who is your dentist?" He may have strabismus, as he evidently does not see that many people ask "Who is your dentist?" in order to avoid him.

The streets, the cars, the churches, and the theatres are so full of people with these glistening gold crowns that it should make one who really cares for the æsthetic side of his profession to hide his head in shame and sorrow.

In the early days the jewellers contributed to our ranks. In these later ones it sometimes seems as if we had gone around the circle only to come back to whence we came.

The setting of diamonds in the teeth is further evidence that some have not lost their early art.

Having eyes, will we never see, and pretending to some comprehension of æsthetics, will we continue to ignore the universally accepted idea, that art that conceals art is the highest; and must we go on inserting in the very mouths of our patients those glistening structures that so completely give them and us away?

Gold crowns placed upon the roots of teeth, as one would place a thimble upon the finger, make the strongest and most durable crowns known to our profession; but our patients are not barbarians, struggling for existence and living in the woods on roots and nuts, that require strong teeth for their mastication.

Instead of that, they are civilized beings,—which means that they have acquired pride of appearance, and have their hair cut, and wear clothes, and try to hide from each other all the physical defects that are the outcome of that very civilization.

And yet it is common for dentists to publish the fact that their patients have poor teeth, by placing gold crowns upon their bicuspid; and once I saw in the mouth of a lady a gold crown placed on a canine, and put there by a man who has a national reputation.

A modern successful novelist carries through one of his books a man whom he describes as a shining example of American dentistry.

To see a glistening gold crown in the mouth of a person is like seeing, as one does in so many hotels in Europe, the sign, "American dentist."

The sight of either gives a peculiar sensation near the diaphragm, and makes one wonder why it is that such a beneficent art can be so paraded and so degraded.

The sane, moderate man does not do these things. His mental make-up is such that he cannot.

If he could be convinced that he ought, he still will not, for he cannot offend his artistic sense even as readily as he can his common sense. Emerson said modern civilization had given the world dentistry and gum shoes. He did not say which he considered the greater blessing. He probably never saw a gold tooth.

We are so tickled with the things we can do by the help of all these modern appliances that we go on doing things that we shall look back upon with wonder and regret when our profession shall have advanced to a fuller appreciation of its true mission, which Oliver Wendell Holmes said was, "to retain the appearance of youth, and to smoothe the wrinkles out of old age." But gold crowns were not known when he wrote that sentence.

There is not time in a paper like this to tell half the things a moderate man will do, nor one-quarter of the things he will not do.

To go further down the list would only exasperate your patience, which is surely exhausted. In rather a jocular, and not a very logical manner, I have gone all round Robin Hood's barn in the consideration of the subject of moderation in practice, and in the matter of moderation in statement. I have given a good illustration of the very thing I have preached against. But possibly you may be willing to admit that the subject is one that allows some latitude, and the impromptu manner in which the paper has been prepared will temper a little, I hope, the severity of your criticism. What I have written has been dashed off in an unstudied manner, and with no time for revision, and without any attempt, inconsistent as it may seem, to eliminate the personal equation. I have only one more thought to express. This imaginary dentist, who, I have claimed, should be so scientific, and to whom I have tried to give a level head, must also be moderate, even with his scientific attainments. I have held him up before you as a cold, exact, unruffled, mathematical, scientific chap, well suited for the lecture-room or the debating society.

Having all these attainments, he might still be a poor stick in the operating-room.

An operator should have warm blood in his veins. Appreciating the weakness and the needs of our common humanity, his heart should be worn on his sleeve, where it can be easily pecked at.

It should be full of tenderness for those of any age who need gentle treatment, and it should be warm with love, particularly when little children come to him with the freshness of spring in their faces.

What would you think of him if, when the little souls ask for a story, he should repeat the differential calculus?

He may have been so absorbed with his scientific studies that perhaps it is the only "Mother-Goose" poem he knows.

He can twirl a drill better than he can turn a joke or a pleasant phrase.

He readily explains that it is not the nerve but the dental fibrillæ that he cuts. Does it hurt any less because he is cutting something that has a Latin name?

No, gentlemen, the dentist should be an all-round man. He should have many sides, and "moderation" ought to be stamped on every one of them.

CANCER OF THE TONGUE.¹

BY E. W. STEVENS, M.D., PHILADELPHIA.

FROM its structure and surroundings the tongue is peculiarly liable to be the seat of cancer. The disease is always of the squamous-celled epithelial type, scirrhus being rarely, if ever, found in this organ. Sarcoma of the tongue is rarely seen, but six cases being recorded in surgical literature.

Epithelial cancer is more frequently met with in the tongue than in any other organ or part of the body excepting the uterus. In 860 cases of epithelioma, collected from the Brompton Cancer Hospital case-book by Mr. Jessett ("Cancer of the Mouth," etc., London, 1892), the tongue was the seat of the disease in 190 cases, or at the rate of 22 per cent.; the uterus was affected in 222 cases, or at the rate of 25.8 per cent.; while the lips were affected in 160 cases, or at the rate of 18.6 per cent. The tongue also stands very high in the scale as compared with other organs affected by any form of cancer. At the Brompton Cancer Hospital, out of a total of 2227 cases of cancer occurring in patients during the ten years from 1882 to 1892, the tongue was the seat of the disease in 190 cases, or at the rate of 8.5 per cent. In 501 cases of carcinoma, collected at the Middlesex Hospital by Mr. Henry Morris, the tongue was the seat of the disease in 7.1 per cent. of cases. In Mr. Arthur Barker's 343 cases, at the University College Hospital, he found as high as 16.3 per cent. of cases of cancer of the tongue; while Sir James Paget, in 500 cases, found 6 per cent. Von Winiwater, in an analysis of 520 cases of cancer, found the tongue affected in 8.3 per cent. Dr. Sibley, on the other hand, in 520 cases, showed the tongue to be the seat of the disease in only 2.6 per cent. of cases.

Lingual cancer is extremely infrequent before thirty years of

¹ Read before the Academy of Stomatology, January 8, 1895.

age. A case has been recorded as early as the twenty-second year by Dr. Shepard, of Montreal ("Reference Hand-Book of the Medical Sciences"). In 58 cases collected by Mr. Whitehead, the oldest was seventy-six and the youngest thirty years of age. In the total of 133 cases collected by Dr. Gross, he found 82 were above fifty years and 51 under that age. The oldest was seventy-eight years of age and the youngest twenty-nine. In 190 cases analyzed at the Cancer Hospital by Mr. Jessett, the oldest patient was seventy-nine and the youngest thirty-two, the average age of the whole number being fifty-two years. The great majority of cases occur between the ages of forty-five and sixty years.

Epithelial cancer of the tongue is much more frequent in men than in women. In a total of 485 cases collected from the tables of Wollfer, Rose, Paget, Barker, Clarke, Morris, Von Winiwater, and Jessett, 414 were males and 71 females.

Heredity does not appear to be an important factor in the production of this disease. In Mr. Whitehead's 104 cases, there was a history of cancer in the family in only six cases. Herr Von Winiwater states that inheritance is excluded in almost all his cases; while in those collected by Mr. Arthur Barker and Mr. Henry Morris, family taint was positive in but four cases. According to Mr. Barker, "It would appear as though the occurrence of cancer in the families of those who have the disease in the tongue was little more than a coincidence."

The question of the liability of smokers to cancer of the tongue is one to which a great deal of attention has been directed of late years. The disease is not more common among males who smoke than among those who do not smoke, while women who are addicted to the habit do not have cancer; and yet, as Mr. Batlin observes, it is not improbable that smoking does to some extent predispose to the disease. If smoking—and the same is true of spirit-drinking—causes sores or leucoma of the tongue, or chronic superficial glossitis, it predisposes the individual tongue in which these conditions are produced to carcinoma; but if smoking produces no appreciable effect upon the tongue, it cannot be said to predispose to cancer.

A large majority of cases of cancer of the tongue are preceded by an abnormal condition of its surface, which has been described under the various names of psoriasis, tylosis, ichthyosis, leukoplakia, keratosis, and leucoma. The term leucoma was first suggested by Mr. Jonathan Hutchinson, and is the only one usually employed. The designation chronic epithelial glossitis, proposed by

Besnier, would appear, however, to be a better one, as indicating its nature.

Leucoma is a chronic inflammation of the superficial mucous membrane of the tongue, which becomes deprived of its natural covering of papillæ, and instead of its normal red color it becomes bluish-white. The surface of the tongue becomes smooth and glazed, here and there marked by shallow furrows. The general appearance of leucoma is not unlike the effect produced by the application of nitrate of silver to the mucous membrane. The patient is not unusually much annoyed by the conditions present. Frequently he may be wholly unaware of their existence. In a patient under my care at the present time with leucoma of the tongue, which is known to have existed for six years, the dorsum looks as if it had received a thin coating of bluish-white paint, and is mapped with delicate furrows. At one spot, about six millimetres square, the tongue is uncovered, and is unnaturally red and somewhat raw. This patient has known for years that something was wrong with his tongue, but it gave him little trouble beyond a slight smarting at times, until about twelve months ago, when ulceration of the tongue ensued. When he first came under my observation, there was a fissured ulcer of the left anterior border of the tongue, with induration and thickening of the same side, sufficient to interfere with distinct articulation.

Leucoma of the tongue is never seen before twenty years of age. It may originate from syphilis or from an irritant, as rough and jagged teeth, smoking, or spirit-drinking; but however produced, it should always be regarded as a predisposing cause of cancer. The first appearance of carcinoma may vary within very wide limits. It may commence as a fissure or ulcer, a pimple or tubercle, a wart or warty growth, more rarely as a lump or nodule in the substance of the tongue. There is ample proof that many of these forms of disease in which cancer first appears are, in the first instance, and even for a long time after, simple non-cancerous affections, but which, being subject to irritation, gradually pass over into cancer.

This transition from a simple into a cancerous condition has been described, by Sir James Paget, as the pre-cancerous stage of cancer, and Hutchinson, Fournier, Butlin, and others, have emphasized the frequency with which non-cancerous lesions of the tongue undergo cancerous degeneration. Hutchinson has traced, on more than one occasion, the gradual formation of a cancer from a simple ulcer, or wart, and has shown how large a part the application of a caustic

plays in the "breeding" of such cancers. Among the most common sources of irritation to which simple lesions of the tongue are subjected are irregular and rough teeth, smoking, spirit-drinking, and, above all, the application of a caustic, as the nitrate of silver. According to Butlin and Hutchinson, if there is one means more certain than another to transform a simple into a cancerous ulcer, it is the use of caustic, such as solid nitrate of silver, so commonly employed.

No clear line of demarcation, either clinically or histologically, can be drawn marking the transformation of a simple into a cancerous condition. The value of the microscope in this connection has probably been somewhat overestimated. Numerous cases have been reported where distinguished microscopists were wrong in their opinion, and what was presumed to be cancer turned out to be gumma. Moreover, a rapid spread of the disease is often seen after removal of a piece of the tongue for diagnostic purposes. When it is done the surgeon should operate at once, if necessary. Mr. Hutchinson recommends that the microscopic examination should be made after, and not before, removal of growth. According to Mr. Butlin, it is not necessary to remove a piece of the tongue in case of ulcer; scrapings from its surface can be used for examination under the microscope.

Any apparently simple lesion of the tongue which does not yield to treatment, after every source of irritation has been removed, should be excised at once, even in the absence of definite signs of cancer. Delay until the disease is fully developed is fatal, and takes away all chance of complete recovery from the patient.

When fully developed, lingual cancer, while widely different in different cases, presents a striking clinical picture. The increasing ulceration and induration, the pain often referred to the ear or temple, the salivation, the fixation of the tongue from infiltration so that it can no longer be protruded from the mouth, the enlargement of the lymphatic glands beneath the angle of the jaw, the gradually increasing difficulty of speech and swallowing, the not infrequent hemorrhages, and the progressive exhaustion mark the onward march of the disease.

The *diagnosis* of the affection at an early stage is most important, but of far greater importance is the recognition of the pre-cancerous stage. Curtis has lately shown that after operations for lingual cancer, in only 6.6 per cent. of cases does the disease not recur at the end of four years, and the proportion of cures after operation will always be comparatively few. The hope of surgery for the

future in regard to lingual cancer lies in prevention rather than in cure (Butlin), and as the pre-cancerous conditions become more easily recognized by those who have the earliest opportunity of seeing them, and as the best methods of dealing with them and removing them at an early stage, if they do not yield to treatment, are more generally appreciated, so we may expect to see a decrease in the number of cases of lingual cancer.

The diseases with which cancer of the tongue is most likely to be confounded are syphilitic lumps and ulcers, tuberculous ulcers, warty tumors, and simple ulcers and fissures.

Simple ulcers and fissures heal rapidly without treatment when the source of irritation is removed, or under the use of simple applications. Should they not do so, cancer should be suspected, and they should be excised at once. There is one form of simple ulcer, the dyspeptic ulcer, which is not unfrequently met with, and which, while it improves under treatment, is prone to recur. It is superficial, and without induration, usually multiple, and appearing in successive crops. It is not likely to be mistaken for cancer.

The diagnosis between cancer and tuberculous ulcer of the tongue is often most difficult. Butlin quotes Nedopil as saying that the four tuberculous ulcers he had met with had all been cut out under the mistaken idea that they were cancer, and the diagnosis was only made after operation. Hajek has lately reported from Professor Schnitzler's clinic, at Vienna, a case of tubercular ulcer of the tongue, with concurrent tuberculosis of the larynx and lungs. A histological examination of a portion excised for the purpose failed to relieve the tubercle bacilli.

It is probable that some of the more brilliant cases reported, where life has been prolonged for many years after removal of the tongue for cancer, were tubercular and not cancerous. The mistake cannot be regarded as a serious one, the best treatment of tubercular ulcer being by excision. A less extensive operation, however, would, probably be indicated in most tubercular cases.

Tubercular ulcers are always secondary to deposits of tubercle in the lungs, and when a patient presents himself with an ulcer on the tip or side of the tongue, with no history of syphilis and with unmistakable signs of phthisis, we should suspect that such ulcer is tubercular.

Secondary syphilitic affections of the tongue would probably seldom or never be mistaken for cancer, and in chancre of the tongue the early glandular involvement and the development of the secondary symptoms will make clear the nature of the disease.

The points of resemblance between cancer of the tongue and the lesions of tertiary syphilis, however, are so numerous and striking that it is sometimes impossible to distinguish between them without the administration of antisyphilitic treatment, which in case of a shadow of doubt should always be employed. The difficulty which sometimes attends the diagnosis of lingual cancer from the ulcerations of tertiary syphilis is shown by the history of the following case:

Mr. T., aged thirty-six, merchant, was referred to me, by his dentist, for an intractable ulcer of the tongue of about four months' duration. Upon examination, the dorsum of the tongue presented the typical appearance of leucoma, with a fissured ulcer situated near the middle of the left border. The left half of the tongue was indurated and nearly twice the thickness of the right. For the past two weeks there had been an aching pain in the left ear. The ulcer was little, if any, painful, discharged very little, and presented a slightly raised base with the surrounding tissues somewhat angry. The glands beneath the angle of the jaw were apparently not enlarged. There was a family history of carcinoma, an uncle having died from cancer of the lip. Syphilis was denied absolutely. The patient smoked cigars and drank alcoholic liquor, but only moderately. The teeth were in excellent condition, and there was no history of injury to the tongue. My diagnosis of lingual cancer having been corroborated by three of the ablest surgeons in this city, to whom the case was referred for an opinion, an immediate operation for the removal of the tongue was strongly urged upon the patient. Owing, however, to some business transactions which required his immediate personal supervision, the operation was very reluctantly on my part postponed for a short period. Meantime a strict hygiene of the tongue was instituted, alcoholic liquors and smoking were given up, hot drinks, and irritating foods were avoided; a mouth-wash, of a solution of borax and boracic acid, was used after eating, and without the slightest expectation of any benefit ensuing, the patient was placed upon antisyphilitic treatment.

In about two weeks' time the ulcer was healed and the induration and swelling of the tongue markedly diminished, and in ten weeks it was of normal size. The leucoma had not improved.

Two weeks of antisyphilitic treatment will usually be sufficient for a diagnosis, and should not be prolonged when improvement does not occur.

Finally, there is only one method of treatment of lingual cancer, removal by surgical operation. Operation not only effects a cure in

a small number of cases, but it usually prolongs life and nearly always affords great relief. According to Mr. Barker, who has collected two hundred and eighteen cases of excision of the tongue for lingual cancer from the tables of Billroth, Whitehead, Rose, Kocher, and others, the average duration of the disease in cases not operated on was 11.7 months, and in those operated on nineteen months, a gain of 17.3 months. The elaborate tables of Wolfler correspond very nearly with those of Barker. Mr. Treves's estimate that the immediate mortality following excision of the tongue is now about ten per cent. may be considered nearly correct. The chief causes of death after operation are septic pneumonia, septicæmia, shock, and exhaustion.

THE RELATION OF MODERN THERAPEUTICS TO THE PRACTICE OF DENTISTRY.¹

BY ROBERT W. GREENLEAF, M.D., BOSTON, MASS.²

MR. CHAIRMAN AND MEMBERS OF THE AMERICAN ACADEMY OF DENTAL SCIENCE,—For the physician and the dentist, as for the artist, it is well from time to time to stand away from his work, to view its special details from a distance, to ascend a hill-top as it were, and to look forth on the surrounding country. Surely such a view can hardly fail in giving one, who approaches it understandingly, a clearer knowledge of the true perspective and relations with adjacent fields borne by one's special work.

It is in this spirit that I accept your invitation this evening to consider with you from the hill-top of this meeting some of the relations existing between our adjacent fields of thought. What, then, is there in modern therapeutics likely to have special relations to the practice of dentistry. Consider for a moment what modern therapeutics really is. We may do this best by contrasting it with historical therapeutics. In early days medicine passed through a stage which, as Brunton well says, may be called the "make believe" stage of medicine. Just as a child peoples the woods with goblins and various queer creatures, all real to him, and just as he acts towards these according to his belief, so physicians

¹ Read before the American Academy of Dental Science, Boston, October 3, 1894.

² Professor of Materia Medica, Massachusetts College of Pharmacy.

of olden times persuaded themselves of the reality of their delusions and acted accordingly. Indeed, not a few, calling themselves physicians, are to-day to be classed in this category. I need not delay you with illustrations of this phase of medicine from the past; simply let me give you one quite possible illustration as it may be seen to-day. Two physicians viewing a patient possessing somewhat indefinite symptoms,—we will say cough, pains in the bones, headache, and perhaps a seeming rose-spot or two,—the one hastily concludes that the patient's disease is typhoid fever. He pictures intestinal ulcers and the various train of lesions he has heard result from this invader. He feels sure of this, and treats him accordingly. Another, only partially trained in his profession, equally satisfied with deficient data, equally inclined to hasty conclusions, to "make believe," as it were, is equally *sure* that the patient is suffering with tuberculosis, and treats him accordingly. Both cannot be right; one must be wrong, and perhaps both are.

From the various phases of "make believe" in medicine, as of the savage with his fetiches and charms, through those of the "isms" and "pathies" of to-day, up to those permitting such an advanced illustration as the one I have just given has come instead an attitude towards modern therapeutics as towards all objective questions, permitting the "I know" or "I do not know," "it is" or "it is not" of modern science.

One intermediate phase of an attitude of thought towards objective knowledge is worthy of note,—viz., the "empiric" method. It has given us much of our knowledge of drugs and pointed the way to many of the inquiries of modern therapeutics. The "empiric" is not content with the "make believe" attitude of thought which accepts a statement as true simply because it seems true to the thinker. He values a fact according as it has happened in the same way in repeated instances, even if he does not understand the "why."

It is obvious that empiricism has given us much of value. Nevertheless, such an attitude has retarded the history of medicine, and is not the attitude of to-day. It cannot reach out into the previously unknown. It cannot explain and say why other remedies may not act equally well. While "empiricism" is a step in therapeutic progress far in advance of the "make believe" phases of ancient medicine or of any form of pseudo-medicine existent to-day, it is inadequate. I can urge upon you no more important truth from a comparative study of the methods for advancing knowledge in our respective lines of thought than this: in all that

pertains to your field let your studies be of this third, this modern type of thought and in the spirit of scientific inquiry. Avoid the "make believe" in whatever guise you see it. Put up with the "empiric" only until you can train the scientific search-light upon the special problem. In this way and in this way alone can you solve the problems of your specialty. It is sheer folly and idle waste of time to hold discussions in the "make believe" attitude of thought. Understand me, however; do not undervalue any question of itself. Nothing can be too small or nothing too large, if it come at all within the powers of human thought, for us to give time to its consideration. It is only of the method of its study that I am speaking. For example, in the one case your associate of the "make believe" type of thinkers says grape acids are injurious because so-and-so's teeth decayed after eating grapes. Perhaps the relation is of effect and cause, perhaps not; that I leave for you to tell me. I use this simple illustration solely to contrast the two types of mind. The scientific student will not rest content, because his patient's teeth decayed after eating grapes, that grapes caused the decay. He will inquire how long has she been eating grapes? What is the state of her health in other directions? Can there be any other cause acting or liable to cause decay? How much acid is there in grapes? Where is it, in the skin or in the pulp? What are its properties, chemical, physical, and otherwise? What are its relations to the constituents of teeth outside the body? How may these relations be modified by the presence of saliva? What are its relations to saliva? etc. When he has answered these and perhaps as many more questions from accurate and painstaking study then he can give you an opinion that is worth listening to; moreover, one not likely to result in acrimonious, heated discussion, but likely to bring the interest and peaceful calm inherent to truth and deep conviction.

To take other questions from your specialty. Which of these methods of studying preparatory to discussions would you prefer when discussing such questions as, What are the best materials or operative procedures for bridge-work? Or, What is the best treatment for pulpless teeth? Or, To what extent is it desirable to "treat" a tooth previous to the introduction of permanent fillings? Or, Is there anything in the idea advanced by some dentists that the mercury or other mineral constituent of amalgam fillings can possibly exert a deleterious effect on the system from its presence, or a possibility of an infinitesimally small amount being absorbed? Whether this obtundent is better than that? etc.

I think you will all agree with me that discussions of any such questions, carried on from the "make believe" attitude of thought, of which I have been speaking, are valueless for advancing knowledge; that from the "empiric" attitude they can have but a limited value, and that the road to this end is that of exact observation, neglecting no point, however minute, following out to the last degree the details of accurate, painstaking experiment; in other words, adopting the methods to-day in vogue in all departments of science.

Let me now point out to you some of the facts ascertained in therapeutics by investigations conducted in this spirit, and see if some of them may not be made use of more fully in your practice than is now the case.

Pharmacology has revolutionized our knowledge of drugs. Of the several things it has accomplished these stand out conspicuously,—

1. By careful chemical examination it has isolated the active principles of many drugs, thus permitting their administration without the accompaniment of inert or deleterious principles.

2. By careful study of the principles thus isolated it has been found possible to produce synthetically similar, in some cases more potent or more conveniently obtained, active principles.

3. By careful experimental study of the action of drugs on animals a correct understanding of their action and a degree of exactness of dosage have been obtained, which have placed the therapeutics of to-day to a great extent on a par with other branches of science.

Biology, in both its botanical and zoological relations, has contributed to this end, as well as chemistry. An acquaintance with the life-history of the cells of a complex organism, repeating with modifications the life-history of the cell when forming the entire organism, as with the amœba, has paved the way for knowledge of this character.

The therapist of to-day is thus enabled to classify his weapons in the battle against disease with some approach to a scientific system. Moreover, just as he has seen opium displaced from its former high rank as an almost universal panacea for human pains he has learned that drugs are only one form of weapon. Though it is with them alone that I wish to occupy your attention this evening, I wish to make myself clear that the therapist regards drugs only at their relative value; that he recognizes the strength of his other weapons, such as the great importance of his

surgical appliances and operations, the efficiency of heat and cold as remedial agents, of pure hygienic measures, such as food and rest, of electricity, of massage, and of that latest of acquisitions, hypnotism, which, always at hand, and in one form or other used for centuries by persons in and out of medicine, yet waiting till to-day to be taken out of the bondage of ignorance and viewed calmly in the light of science for what it is worth.

Restricting our view from all these collateral fields of modern practical medicine, let us come now solely to the landmarks of therapeutics with which this discussion is primarily concerned.

Pharmacology enables us to classify medicine into two general groups, which we may call, in the language of botany, divisions. These are medicines acting *systemically* and those acting *extraneously*. The anodynes, the stimulants, the cathartics, etc., are illustrations of Division I. Disinfectants, anthelmintics, etc., are illustrations of Division II. These divisions are again divisible into smaller groups,—viz., the classes *general* and *local*, and each in turn is still further subdivisible into its respective subclasses.

Of the systemic subclasses of a general action we have three very natural representatives,—viz., (a) nervines or drugs acting to modify the action of the various parts of the nervous system; (b) cardiants or drugs similarly acting on the heart and circulatory organs; (c) nutriants or drugs which act conspicuously in influencing the nutrition of the body, as is the case with some of the various tonics, antiperiodics, etc. Each of these subclasses is similarly subdivided into its respective smaller groups, which are not inaptly termed “families” by certain writers,—e.g., the nervines include antispasmodics, anæsthetics, somnifacients, delirifacients, excito-motors, and depresso-motors.

Illustrative of the subclass of locally-acting medicines are some astringent drugs, most cathartics and emetics, also rubefacients, escharotics, etc. A single illustration will serve to indicate how these drugs are studied in order to ascertain their action. *Nux vomica*, for example, is a drug for a long time known empirically to have poisonous properties.

Chemists isolated its alkaloids, strychnia and brucia, made salts of them, crystallized them, found that they existed in the plant in combination with an acid, igasuric acid, and studied them carefully in all their chemical relations.

Then the physiologist and the pharmacologist took these products and administered them separately and in combination, in large and in small doses, to various animals. It was noticed that most

were thrown into convulsions, just as in the case with man; that death would result from a certain large dose; and that at the other extreme—*i.e.*, on the administration of smaller and smaller doses—the effects were less and less marked until a time came when no appreciable effects were produced. It was further noted that when single small doses were administered the effects of the drug ceased after a time, and that this cessation was coincident with its elimination. Then came a series of experiments on how to produce these convulsions. These demonstrated the conclusion that strychnia, besides other actions, produces its effects by direct stimulation of the anterior part of the spinal cord. No one can follow these experiments without feeling the greatness of the human mind which can reach truth through such intricate paths; now the physician, armed with such a knowledge of the action of this drug, applies it to conditions to which the pathologist has given him the key. Thus armed he can use his weapon effectively and safely. He can stimulate the flagging nerves of any organ. It may be the intestine, when the symptoms of disturbed digestion have brought the patient to him. It may be the flagging heart or lungs just ready to give up the battle in the crisis of acute disease. With this powerful stimulant, or with atrophia, digitalis, or morphia, he is sometimes privileged even to stand between a patient's life and death.

We come now to a more special, a still nearer view of drugs: descending our hill-top as it were, to see close at hand which of these groups are especially worthy of the dentist's study. It is obvious that to-night we cannot pick apples from every tree in the orchard of the therapeutic families which would serve your purposes, but let us look at a few of them in the moments that are left us.

The family of antiseptic drugs is certainly worthy of most careful study. The painstaking work of the bacteriologist has shown us how intimately inflammatory processes are connected with the presence of micro-organisms, and he, in connection with the pharmacologist, has given us a long list of drugs which arrest or destroy their activity. Besides corrosive sublimate and other powerful germicides, destructive to our instruments as well as to the germs, they have given us a host of others, as the volatile oils, etc., harmless, even agreeable to our patients, yet serving their purposes admirably. No dentist can turn to the great treatise of Sternberg on bacteria, or to the masterly work of Miller ("Die Microorganismen der Mundhöhle"), or to various other recent works on this subject, without finding much value for use in his daily work.

More than this, we are made familiar with the principles that "asepsis" is what is aimed at, and that soap and water and the most scrupulous cleanliness are essential. Impressed with these results of the pharmacologist's studies, the modern dentist cares for himself, his instruments, and all his equipment, with such a regard for neatness, cleanliness, and the most rigid asepsis and antiseptis that the most painstaking surgeon might well view the appliances with pride.

Let us glance at another tree of our therapeutic garden,—viz., that of anæsthetics. Surely here again we have a family of drugs of especial value to the dentist. Nitrous oxide has done yeoman service for many a year; but would it not be well to give a little more care to the study of ether and chloroform, to know not merely that these powerful anæsthetic agents are dangerous weapons, but also wherein their danger lies?

It seems to me that every dentist should understand the uses and dangers of anæsthetics, also their indications and contra-indications; then, if he chooses, he may use them safely. If he will not learn these matters he must be regarded as criminal to dare to use such weapons. Various new anæsthetics, as bromide and chloride of ethyl, bromoform, etc., are coming into medicine, which may or may not replace our old friends. One other anæsthetic, possessing potent properties of another character,—viz., the local anæsthetic cocaine, which is a delirifacient as well,—deserves more than a passing mention. This extraordinary drug, one of the most useful for performing minor operations, is a dangerous weapon. Though most dentists are deterred from using it at all, I am informed that some are using it with a rashness unheard of in surgery, for the surgeons have learned to fear its immediate toxic action, and find it capable of inducing a "habit" more treacherous, more deadly, than those of alcohol and opium.

This question of "obtundents" is attracting much attention in dentistry at present. Numerous papers are appearing on this subject. It is an auspicious sign. It means that the dentist is rising above the mere mechanical routine of his art, and is seeking what else he may do in the service of his patient.

Closely allied to the family of anæsthetics are the somnifacients and antispasmodics. Of the former we have opium, chloral, and the like. Of the latter, several drugs, as assafœtida, musk, valerian,—relics of the historical days of medicine. Let us include among them also, for the purpose of the point I would present to you, the members of the group of antipyretics, such as antipyrin, acetanilide,

and phenacetin, which possess as well anodyne properties. Not to weary you with the details of their special powers, let us consider for a moment the question, How far is a dentist justified in their use? I understand that it is the exception to advise the use of any of these drugs. This appears to be a wise course, inasmuch as prescribing should be undertaken only after an earnest and a careful study of underlying physical conditions, to the consideration of which a dentist can hardly devote sufficient time, even though he be trained for the task. I should place his attitude towards this part of the question on the same basis as that of other specialists, such as aurists and oculists,—viz., the ability to recognize in a general way that a need exists; then, if best, to advise obtaining the proper counsel from the specialist competent to give it.

To obtain such an ability, it is necessary to study the fundamental principles of medicine, as one is not likely to see things of which he has no knowledge.

With it, however, the medically-trained dentist will find many cases in which his patients are needlessly suffering, because they are not given some antispasmodic, tonic, or other aid,—hygienic or otherwise,—indicated by their condition. Moreover, with such knowledge the dentist will find that he is far better equipped for understanding the problems of his own specialty.

Such broader knowledge is to-day considered so desirable that the best dental schools have endeavored to incorporate it among their requirements.

Let us return for a moment to a consideration of still other groups of drugs. Some of them have no obvious relations with dentistry in its more special fields. One may ask why a knowledge of expectorants, sialagogues, and the like, is needed. For reasons already indicated, I consider that such knowledge should form a part of his general training.

However, for mere utilitarian reasons, though such as not of the highest, it may be well to know that sialagogues, such as cubebs and pellitory, might relieve a toothache, particularly of a rheumatic type, simply by locally relieving a congestion. Take mercury also, to which we have already referred,—that is a sialagogue as well as an alterative and antiseptic, and it is well to understand the properties of a drug you are thrown in contact with in so many ways.

We may pass such families as emetics, cathartics, and anthelmintics without especial reference to-night, except to note that each contains some drug, the need of which may be clearly indicated in certain patients under your care, who, but for your friendly counsel,

might go unrelieved for years, or suffer serious illness which might have been prevented.

Astringents and rubefacients each have representatives which may serve a dentist well, as in the component parts of tooth-powders, or in special washes for the gums. Illustrations of their usefulness are, doubtless, familiar to you all. The groups of protectives and absorbents also have their respective members, which are useful handmaids of dentistry; but I need not prolong the list.

What I would emphasize to-night I would briefly summarize as follows: In going back to your special field, the lesson may be discussed from the field of modern therapeutics, that more knowledge is to come, not by approaching it as does the "make believer," or the "empiricist," but as the therapist is doing,—viz., from the standpoint of the modern scientist, whether he be the chemist, the botanist, or even the psychologist.

Furthermore, I would emphasize that the therapist, by study of such a character, has ascertained many facts, has classified them and arranged them for your service; that some of them are already your daily servants; that even of these there are some points as yet unused which you would doubtless find of value; then that there are other agents, a knowledge of which should form a part of your professional training.

These, then, are among the questions which, viewed in the field of therapeutic knowledge, are seen to have important relations with those of the allied field of dentistry.

Reports of Society Meetings.

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, November 20, 1894, at the New York Academy of Medicine, No. 17 West Forty-third Street, New York City, with the President, Dr. Brockway, in the chair.

The secretary read the minutes of the previous meeting, which were approved.

INCIDENTS OF OFFICE PRACTICE AND CASUAL COMMUNICATIONS.

Dr. Davenport.—Within the last week I have been so pleased over the accomplishment of something which I have not often done

that I decided to speak of it here. A lady who has been for some years wearing a full upper denture recently consulted me because the plate would not keep its place while eating or talking. While the plate fitted accurately and had good suction when it was made, it has recently—the mouth being very soft—become exceedingly loose, and it seemed imperative at first to make a new plate, very much against the wish of both the lady and myself, for the proper arrangement of the teeth in her case takes a great deal of time. As it happened, she possessed a full upper rubber plate, which she had not worn for a number of years, and the teeth upon that plate were entirely satisfactory to her in appearance, but of course the plate did not fit. I suggested experimenting with the old plate, to see if I could not so change it that it would answer her purpose without much expenditure of time. A plaster impression of the mouth was taken, the band of the plate was cut down almost to the teeth, and the entire centre cut out, so that nothing was left but sufficient rubber to hold the teeth in place. This being placed upon the plaster cast and waxed up as usual, was next tried in the mouth and slightly changed to obtain the correct articulation, after which it was finished in the usual way. The result was satisfactory, and the whole thing was accomplished with a very small expenditure of time. I thought it worth while to bring this to the attention of the Society, because very often, with people over forty years of age, duplicate plates will accumulate, and often it may be possible to make those changes easy for patient and operator, and still bridge the patient over a number of years.

Dr. Hodson.—I do not want to steal Dr. Davenport's thunder, but many years ago, in my student days, Dr. S. B. Palmer used regularly to do that sort of thing for his patients, so making the permanent plate out of the temporary one. He had a little circular saw, with which he could cut out the centre of the plate, and often made the permanent plate in that way.

To go back to our incidents of office practice, I would be glad of some suggestion, if any gentleman has any new one to apply to the always difficult and unsatisfactory condition of a plate carrying the lower back teeth, the natural front ones from cuspid to cuspid being *in situ*. In this particular case—the most discouraging one that my brother (whose specialty that department is) has ever seen—it has been impossible by any means which his ingenuity could devise to hold the plate firmly and comfortably in position. We have even considered the possible propriety of sacrificing the cus-

pids for the purpose of holding posts for a bridge; but hope to find something else or some other way to accomplish the result desired.

Dr. Littig.—Are the teeth entirely out back of the cuspids?

Dr. Hodson.—Yes. I have been hoping that somebody might have something new to suggest. I have never seen one that was nearly successful where the clasp around the front gum was used, while these cuspids are of such shape that it is practically impossible to get any clasping of sufficient value to hold the plate.

Dr. Littig.—Why not put a cap on the cuspids?

Dr. Hodson.—That could be done, of course, but would be very unsightly, as, from their position and the fact of their being live teeth and too sensitive to cut down much, the caps would enlarge them seriously for the front of the mouth, and either the clasps or sleeves of sufficient strength to hold such a plate under strong mastication coming outside of this would be inadmissible.

Dr. Jackson.—I would suggest that the doctor make a slight space, by wedging between the cuspid and the lateral incisor on each side of the mouth, and extend springs of clasps from the plate on the palatal side of the teeth through the spaces, having the plate fitted well to the distal side of them, and letting it extend somewhat towards the front. In that way he will be able to retain the plate firmly.

Dr. Littig.—I would state that you cannot make a partial lower plate remain satisfactorily in the mouth where there is not sufficient elevation at the ramus to prevent its sliding back, unless you clasp the teeth in front.

Dr. Hodson.—The ridge is nothing but a thread on one side, and is as tender and delicate as possible, so that the cast has to be built up with wax along this knife-like edge, to keep the pressure of the heavy plate upon it from being painful.

Dr. Huntington then read a paper on contour.

DISCUSSION.

Dr. Davenport.—We are all apt to feel that when some one agrees with us, he is a pretty good sort of a fellow. It has been my contention for years that it mattered less what material was chosen for a filling than it did what form the filling was caused to assume. I have even found that in certain mouths where soft teeth were to be treated, that the much-condemned phosphates, if properly and snugly contoured, would make very durable approximal fillings, which in my opinion is more a proof of the value of

contouring than of the phosphates. I congratulate Dr. Huntington upon his paper, for I feel that we cannot too often refer to this matter or too forcibly impress upon the young members of the profession who are coming forward that the majority of the dentists of the present day believe the contour filling to be the proper filling for the patient's comfort and the preservation of teeth.

Dr. Howe.—I very heartily approve of what Dr. Huntington has advocated so well in his paper. I congratulate him on being able to present the idea that he wished to convey in so impressive a way. I would say, however, that we always expect the essayist to inform us rather than to ask us conundrums, and I wish very much that he had told us, before he concluded his paper, how he fills pin-head cavities in approximal surfaces of molars.

Dr. Davenport.—I did not intend to pose as an advocate of zinc-phosphate, desiring only to emphasize my preference for contour fillings even of the poorest materials over flat fillings of more durable materials. I still assert, however, that in many cases zinc-phosphate contour fillings, made of Smith's adamantine cement, Poulson's cement, or the so-called Harvard cement, have given me great satisfaction.

Dr. Hodson.—Do you use anything else in your cervical margins?

Dr. Davenport.—It is my usual custom to use at least a half-matrix for such fillings, and often I pack a thin layer of some dense gutta-percha at the cervical wall.

Dr. Sailer.—I would like to emphasize the point about the pin-head cavity between the bicuspid and the molars. While I agree with Dr. Davenport in endorsing the general tenor of the paper, I also agree with Dr. Howe as to the essayist not giving us the benefit of the new ideas which occurred to him. That question has been raised, but not answered. I find that in the majority of cases you can fill pin-head cavities between bicuspid and molars with the point which we all have heard Dr. Dwinelle and Dr. Lord speak about, and tin. I find the most difficult thing about them is the forming of an undercut which will retain the tin. If you can form the undercut, you can fill with tin every time. I hope I have answered the question to Dr. Howe's satisfaction. It is an important question which occurs to every dentist.

Dr. Jarvie.—For the sake of bringing out a little discussion, I would state how I fill such cavities. For instance, if the decay is between the first and second molars, and there is a pin-head cavity in the approximal surface of each tooth, I will cut through from the grinding surface of the first molar into the cavity in that molar.

and use the space I gain in that way to fill on the approximal surface of the second molar, making a compound cavity in the first molar and a simple cavity in the second.

Dr. Sailer.—Would Dr. Jarvie do the same with the bicuspid?

Dr. Jarvie.—That is my rule in all approximating cavities of that size between first and second bicuspid, second bicuspid and first molars, or between first and second molars. That is my rule, but I do not say I make no exceptions. I cannot fill such cavities satisfactorily unless I cut into one of them from the grinding surface.

The President.—Do you see any objection to that method, Dr. Sailer?

Dr. Sailer.—I do, because if there is sufficient tooth substance left on the grinding surface of a bicuspid, it should be saved, for as soon as it is lost, we know it is liable to split apart. By a little extra patience on the part of the operator and the patient, you can get the teeth far enough separated to operate on without cutting away any portion of the grinding surface.

Dr. Perry then read his paper entitled "Moderation in Practice and in Statement."

(For Dr. Perry's paper, see page 133.)

DISCUSSION.

Dr. Jarvie.—The paper is of such a character that it is almost impossible to discuss it; it is above criticism. It has gone into the merits of moderation both in statement and in practice so thoroughly and so well that I have nothing to say except in commendation. I think Dr. Perry has given us a treat to-night, one that we have all enjoyed thoroughly.

Dr. Howe.—I not only approve in emphatic though moderate terms of Dr. Perry's position, but I think what he has said is called for. If the mass of dentists will give heed to what has been said in this paper, they will be greatly benefited, and dentistry as an art and as a science will be greatly advanced. I wish especially to commend Dr. Perry's criticism, in the way he has put it, of the abuse of bridge-work and of gold crowns. The exhibition of gold crowns, as described, and as we all have had them thrust upon our notice, is one of the disgraces of the period.

Dr. Davenport.—Some of the best novels of the day are based upon historical events, and Dr. Perry's delightful paper, to which we have listened this evening, seems to be based upon the life of

the Father of our Country, who was "First in war, first in peace, and first in the hearts of his countrymen."

I would like to suggest a modification of that and apply it to the essayist,—“First in theory, first in practice, and first in the hearts of his fellow-dentists.”

Adjourned.

JOHN J. HART, D.D.S.,
Editor New York Odontological Society.

ACADEMY OF STOMATOLOGY.

A REGULAR monthly meeting of the Academy of Stomatology was held at the rooms of the Academy, 1731 Chestnut Street, Philadelphia, January 8, 1895, the President, Dr. Jack, in the chair.

After the transaction of routine business, Dr. S. H. Guilford presented to the library of the Academy certain publications donated by Mr. Charles F. Wells, son of the late Dr. Horace Wells, of Hartford, Conn., and said, “At the meeting recently held in Philadelphia to celebrate the Fiftieth Anniversary of the Discovery of Anæsthesia, Mr. Wells stated that he had in his possession certain documents of his father's that were out of print, and very kindly offered to send me copies of such as he had. I have received and desire to present the following publications to the library in the name of Mr. Charles F. Wells: ‘Dr. Wells's Discovery of Anæsthesia,’ published in 1870; ‘The Discovery of Horace Wells,’ 1850; and an ‘Essay on the Teeth,’ by Horace Wells, 1838.”

The secretary presented a specimen consisting of an unusually large deposit of tartar attached to a dental plate, donated to the museum by Dr. Ford, of Toulouse, France. By vote of the Academy the secretary was requested to convey the thanks of the Academy to the donors.

The paper of the evening was then read by Dr. E. W. Stevens, of Philadelphia, on the subject “Cancer of the Tongue.”

(For Dr. Stevens's paper, see page 146.)

DISCUSSION.

Dr. H. H. Burchard.—Dr. Stevens states in his essay that heredity appears to play a small part in the origin of carcinoma. I remember Professor S. W. Gross placed the percentage as a low one; but there does appear to be a special diathesis connected with car-

cinoma, for all who are subjected to the same sources of local irritation are not victims, and in several individuals some local disease process may arise and show for a time the same conditions, but in one carcinoma results and in others does not. Carcinoma itself is a proliferation of epithelium in lymph-spaces and lymph-tracts; thus, the anatomical condition separating benign and malignant growths is that structure indefinitely described as basement membrane, a membrane composed of skin or gland, that being the barrier between the lowest layer of epithelium and lymph-spaces. It does not seem inclusive enough to ascribe, as Cohnheim does, the origin of leukoplasis to nests of embryonic cells, but undoubtedly this is a rational explanation in some cases. The present hypothesis of microbial origin is by no means conclusive.

In the invaginated epithelium of the embryonic jaw, which forms the enamel-organ, we see the sharp line of demarcation between epiblastic and mesoblastic tissue, and see how the line remains unbroken; but why epiblastic tissue should break from its restraint and proliferate in the spaces of mesoblastic tissue, is one of the most vaguely comprehended problems of pathology.

I have heard Dr. Stevens and other surgeons express themselves as sceptics in regard to the value of microscopic diagnosis of neoplasms, but I have the records of two cases to add as supplemental to his, which will serve to demonstrate that clinical diagnosis may be equally undeterminate; in fact, it scarcely needs argument to prove that it must be more so.

The first, a gentleman of about fifty years, was referred to me by the late Uriah Kirk. The patient had upon the left lateral aspect of the tongue, about midway, an ulcer, say one and a half inches long, one inch broad, elliptical; hard, raised edges, almost indurated, gray, pasty base, and giant granulation; shooting pains along the inferior maxillary nerve, but no lymphatic involvement.

He denied syphilis, and no history even pointing to that malady could be elicited. I extracted the stump of the wisdom-tooth, rounded and smoothed the lingual cusps of the second molar, gave him a salicylic acid mouth-wash, stopped his smoking, and in three weeks recovery followed.

I was almost certain that the disease was epithelioma; in fact, a surgeon had so diagnosed it. My treatment was designed as tentative, pending a consultation with Professor Garretson.

The second case, a gentleman for whom I was about to do dental work, spoke to me of an angry-looking ulcer on his tongue; this was about the size and had the appearance of the preceding one,

except that it was more circumscribed, and the induration and giant granulations more pronounced. A surgeon had been making applications of nitrate of silver. There was no family history of carcinoma, but little induration, no lymphatic involvement and no pain. No history of syphilis. He desired that I treat him. The teeth were smoothed, tobacco and spirits prohibited, and potassium iodide, eight grains three times a day, prescribed. In ten days no change whatever, and I referred him to a surgeon. One-third of the tongue was amputated; sections demonstrated the disease to be epithelioma. The wound healed well, but in three months the disease recurred, this time appearing on the other side of the tongue, and in a few months death resulted.

In this case were none of the symptoms of carcinoma other than giant granulations, and yet it proved to be cancer; in the other were the symptoms and appearance of malignancy, and it proved to be benign.

Dr. M. H. Cryer.—I have very little to say on the matter of the paper, as I coincide almost entirely with the views expressed. I would like to ask Dr. Stevens what was the mouth-wash used in the case of which he spoke. He spoke of putting him under specific treatment, using a mouth-wash.

I infer that he makes no line of demarcation whatever between ulcer of the mouth and carcinoma; he also recommends surgical interference at a very early period. If there is anything in the germ theory, and we have an ulcer that forms a ground or nidus for germs to take root and produce a growth, if we should amputate, do we not make more ground or more of a sore in which the germs may proliferate, and would not death ensue much sooner?

In regard to the use of nitrate of silver, I have had a little experience in patients where it has been used, which have been sent to our hospital. By discontinuing the use of nitrate of silver, and putting the patient under other treatment, using a wash or the powder of subnitrate of bismuth, I have seen the cases much benefited.

Dr. James Truman.—This matter is of considerable importance to dentists, although I do not profess to know much about it, as very few of us have anything to do with cancer of the mouth, especially of the tongue. But, passing along through life, I necessarily have come across a number of such cases, and I have been impressed with one feature in relation to epithelial cancers,—viz., the tenacity with which many so afflicted hold on to life.

Ordinarily, in tumors of the mouth, I think it is very difficult

to distinguish between those which are benign and those which are malignant. I had a patient that had a benign epithelial growth in the mouth for years. He wanted to know my opinion about a surgical operation, and I advised against it; and throughout his life it never gave him any further trouble.

Another case that came into my hands was decided epithelial cancer. As I would not think of treating such a case in the ordinary way, I sent him to a surgeon who operated for its removal. I saw the patient afterwards, and he was doing very well, but how long will that individual be likely to live? The growth will recur in ninety-nine cases out of a hundred.

Another case of epithelial cancer, not on the tongue, but on the lip: the man who had it outlived two of the surgeons that operated on it; both died; he was then in care of the third one. The entire anterior portion of the jaw was gone when I last saw him. He died, however, in the course of two or three months.

It seems to me that we, as dentists, are not careful enough in our treatment to remove all rough places from the mouth. I am one of those who believe in heredity. I believe that persons may have alteration of the tissue in such a way that it may easily become deranged by any irritation that may take place upon its surface. Of course I know that the general idea is that phthisis and all other diseases of that kind are not and need not be necessarily caused by irritants; that it is simply derangement of the tissue; the same thing occurs, I think, in cancerous affections.

Dr. Stevens.—The wash which I usually use in these cases, is a solution of ten grains of chromic acid to the ounce of water. It seems to remove pain and act beneficially. The treatment was employed, and the wash that was given, was simply a solution of borax and boracic acid.

In regard to the question raised by Dr. Cryer, as to amputating some of the tongue and furnishing a nidus for a new growth of carcinoma, it must be said that the etiology of cancer in the cases reported in the paper has remained down to the present day one of the most obscure problems of medicine. Lately some investigators thought they had discovered the cause in a parasite, but the idea was not realized and was vigorously opposed and in the end defeated. Up to the present time no specific microphyte, bacteria, or micrococcus has been cultivated from carcinomatous tumors. Neither have they been able to transfer the disease by bacteriological culture to any of the lower animals. It must be admitted, however, that many pathologists still hold the idea that cancer is

of a parasitic nature, and there are strong clinical reasons for believing it to be an infective disease.

The literature on the subject is enormous, but the question has not been settled. I thought it would be better to leave that question out of the paper entirely. You will understand that a paper upon so large a question as this is simply touching upon the surface of a very large subject. The members of the dental profession are the ones who will have the best opportunity to observe these various conditions which I have endeavored to describe. There is a good deal to be learned about it, and it is only by observation that we can finally procure much information about it. The question of leucoma of the tongue is something not very well known to medicine. It is only of late years leucoma has been regarded as a predisposing cause of cancer. Many surgeons regard it as more significant of cancer than ulcer of the tongue. I have seen the condition several times myself; two cases referred to me by Dr. Jameson. One case a few weeks ago of syphilitic origin, undoubtedly; for the patient suffered with other symptoms of tertiary syphilis which quickly responded to proper treatment.

Dr. Truman.—Why do you use chromic acid instead of nitrate of silver?

Dr. Stevens.—Nitrate of silver seems to act as an irritant. All strong caustics should be avoided. It does very well in ulcers of young people, especially children; but experience has shown chromic acid to be more beneficial.

Dr. Truman.—The reason I ask is that, in my experience with chromic acid, it burns absolutely the albumen of the tissue; whereas nitrate of silver penetrates very deeply, coagulating very deeply, and I wondered whether that had anything to do with why chromic acid should be preferred to nitrate of silver. It seems to me chromic acid, because of its burning superficially and destroying the tissue, would be preferable to nitrate of silver.

Dr. Stevens.—Chromic acid acts as a superficial caustic, and those who are working in diseased conditions of the nose very well know there is a great deal of defective information regarding the use of chromic acid. It is a superficial caustic.

Dr. Kirk.—Will Dr. Stevens describe the characteristic features of the condition known as leucoma of the tongue somewhat more fully than he has in his paper?

Dr. Stevens.—I endeavored to have a couple of patients here to-night, but, as they were both specific cases, they did not care to be exhibited. Mr. Rau made photographs for me of these cases,

but, as they do not show the condition, I thought best to leave them at home. Leucoma is really a superficial inflammation of the tongue,—superficial chronic glossitis. The tongue loses the natural papillæ, and becomes glassy and smooth. It is not a coating of the tongue or anything like a fur on the tongue, as we frequently see, but it is an affection of the superficial mucous membrane, and is soft. As I stated in the paper, it looks as if it had been brushed over with a layer of nitrate of silver.

Dr. Kirk.—Does it extend beyond the tongue, or encroach upon the rest of the mucous membrane?

Dr. Stevens.—It may extend from the tongue to the other mucous membrane, particularly that of the cheeks where the teeth come together, opposite the junction of the tongue and teeth, and may sometimes be observed on the gums also. It is very much like smoker's patch. In the mouths of those who smoke a pipe and never change its position in the mouth, letting the smoke come in contact with the same place, the tobacco smoke acts as an irritant, and produces local inflammation of the tongue, which is practically leucoma of the tongue; it is, however, of a darker color, and usually, in the cases I have seen, the coating peels off, leaving a raw surface exposed; but this condition known as smoker's patch is the same condition as that known as leucoma of the tongue.

Dr. Truman.—Does it not amount to ulceration underneath?

Dr. Stevens.—It predisposes the tongue to ulceration. In some places this leucoma peels off and leaves an open patch, which after a while becomes covered over again.

Dr. Cryer.—About eight years ago a patient came under my charge with what was then pronounced a carcinoma of the tongue, and it was the intention to have an operation performed. It was recognized by Professor Garretson as leucoma of the papillæ of the tongue and cheek. It commenced about the median line of the tongue, and extended over the surface of the left alveolo-lingual border into an open space where a second and third molar had been extracted on to the cheek, covering the whole region to the line of Well's duct, and it had, especially on the cheek, the glassy appearance Dr. Stevens described, and it was thought that at that point it might become malignant; for that reason the operation was suggested. Instead of the operation, the patient was placed upon a hygienic diet, and nothing was used on the parts except nitrate of bismuth painted over with a camel's-hair brush. The patient commenced to improve, and within six months had perfect

comfort. He comes to the hospital every three months, and if there is a little patch having an angry look it is simply painted over with nitrate of bismuth. It is now, I believe, eight years that the patient has been thus carried along comfortably.

Another patient reported two years ago with very similar conditions; after treatment of about three months he left the hospital, and we have not heard from him since, and presume he is well; he was apparently quite well when he left.

Dr. Jameson.—During the last four years I have referred three patients, one to the late Dr. Agnew and two to Dr. Stevens. The first was fifty years of age, and, while doing dental work for him, I noticed he had an angry-looking sore on the median line of the lip. He was an inveterate smoker, but I cannot say this had anything to do with it.

I asked the patient how long he had been suffering with the sore, and he said several months. Being a friend, and being interested in him, I recommended him to go to one of our surgeons at once. He seemed to think it was of no importance, and went to Atlantic City, and in three or four months' time it gave him increased trouble. Dr. Reed and the late Dr. Agnew removed a portion of the lip. He came to have some dental work done some time after, and there was a small portion that had not healed; and owing to this I had considerable difficulty in doing the work. A second operation was afterwards performed, more of the lip being removed. He had three operations performed altogether, and in the course of two and a half years from the time I called his attention to the sore he died.

I think the function of the dentist is to be on the lookout for these conditions and recommend the cases at an early period to a specialist. In one patient, thirty-five years of age, I had noticed, instead of the glassy appearance Dr. Stevens describes, an appearance more like the cicatrix from a burn, although it did not have that color, but something more like lead color. There was also the same condition upon a line running antero-posteriorly to the lip where the cheek conforms to the teeth. I referred the case to Dr. Stevens, and he was put under treatment, and in a short time his tongue improved. Two of the most prominent surgeons of Philadelphia recommended that the tongue be removed. It was like a thunder-bolt out of a clear sky, and upset him very materially. He put it off, and made such improvement under the treatment that it was not considered well to have the operation performed, and to-day he is better and more comfortable than for many years.

Four months ago I referred a gentleman from Chicago to Dr. Stevens, and upon seeing him a short time ago he reported that he had not been as well for a number of years. He had been treated in New York with nitrate of silver, and had gotten worse, but under the chromic acid and antisypilitic treatment is now a comparatively well man. In both cases the men were very thankful that they had escaped the surgeon's knife.

On motion of Dr. Truman, a vote of thanks was tendered to the essayist, and the subject was passed.

CASUAL COMMUNICATIONS.

Dr. Burchard.—The revival of the interest in the uric-acid origin of phagedenic pericementitis, due to the essay of Professor Peirce, in which he demonstrated a relationship between the two conditions, has led most of us, no doubt, to a more careful search for arthritic history of patients who are the victims of pyorrhœa alveolaris.

In some fifty cases which I have seen, among my own patients and those of other dentists, there has been found an undeniable history of gout in more than half. In some were marked hereditary manifestations and acute outbreaks; in others, a rheumatic history. Some, in whom no evidence of what the text-books of medicine describe as even obscure gout, were unmistakably the subject of the American gout, lithæmia, the type of disorder graphically described by Da Costa in his "Medical Diagnosis."

It has been denied that the origin of the dental disease is ever found at any point other than the gingival margins. Professor Peirce's descriptions show the contrary; and, to add to his list, I have just seen a patient of Dr. Gilliams, who had the type of teeth which fall victims to this disease,—dense tissues, dental, alveolar, etc. Over a superior lateral and central incisor, near the apices of the respective roots were swellings, apparently abscesses; marked fluctuation at the summits of the swellings, and some turgescence of surroundings, but at the gingival margin the dental ligaments were undetached, and for half an inch above there was no evidence of inflammation. On incision through each swelling a free flow of blood followed, but apparently no pus; unfortunately, my microscope was not at hand, and this question remained undetermined, the blood flowing as freely as though a small vein had been incised. Passing a small scale through the openings made, there was found a loss of alveolar process and a marked roughness of the roots.

The patient had been seen some time before, and tartaralithine prescribed, and the swellings which were present disappeared.

The swellings reappeared exaggerated, coincident with an attack of acute muscular rheumatism. A rheumatic family history was obtained; a sister of the patient, a rheumatic, had lost several teeth through this process.

It seems that the results of the investigations as to this disorder must lead to renewed inquiry by the general pathologist; for this disease, associated as it is frequently and unquestionably with true gout, the arthritis of classical symptoms, the same dental manifestations are present in a series of disorders, most of which are described by Haig, in which an antigout treatment removes the general symptoms and ameliorates those relating to the teeth. The general manifestations are chronic gastric catarrh, hepatic disorders, forms of anemia, renal diseases, and catarrhs in general; in all of which there is undoubtedly a close association with uric-acid retention.

I desire also to make a record of my experience in the use of salol.

Since the publication of Dr. Mascort's excellent paper in the *Dental Cosmos* on "Salol as a Root-Filling," I have been using that substance almost exclusively for this purpose, and, so far as some ten months of trial can prove, with uniform success. A solution of sodium peroxide is first used to saponify fatty material, dissolve and drive out the contents of the tubuli. This is neutralized by a weak solution of sulphuric acid followed by thorough drying with alcohol and hot blast; then with a pair of long-pointed dressing pliers a portion of crystals is taken up and held above a small flame until it becomes fluid. The closed points are then placed as high up the canal as possible, and slowly opened, the fluid runs up the dry canal. An iridium broach warmed is used to pump the salol to the apex, and in the still fluid material a point of metal or gutta-percha is thrust. This is used in the event of reopening of the tooth ever becoming advisable. By warming the point it may be withdrawn, and with it the melted salol, rendering access to the apex easy. Experimenting with teeth out of the mouth has demonstrated some difficulty in removal where a central mass of other material has not been used.

Dr. Kirk.—I would like to bear testimony to the value of salol as a root-filling material. Since the publication of Dr. Mascort's paper and for a month previous to that, because I had the paper in my possession fully a month before it was published, I have used nothing but salol for filling roots in my practice. I have, in some cases, used it in connection with a gutta-percha point, but generally

without it. It crystallizes solidly in the canal. When it is melted and introduced into the warm, dry canal, it apparently flows into the uttermost extremities of it. It has a fluid character like melted paraffin or the paraffin oils, and in a few moments it crystallizes. I have yet to have the first case of apical pericementitis follow a case so treated, although I have been almost, you might say, careless in the use of it,—that is, I have used it in immediate treatment of cases and those of recent devitalization, and it has been uniformly satisfactory to me.

Dr. Roberts.—Salol melts at a very low temperature, so low that a mouthful of hot water will melt it if held there. Now, if it is melted by the use of hot drinks, would there be any absorption? Or is it dissolved in any way in water or moisture? And also, if it should melt, would there be any damage done in the canal?

Dr. Kirk.—It is quite impossible to melt salol in the root of the tooth with hot liquids taken as drink. It melts at 104° F., so that the danger suggested by Dr. Roberts would be eliminated, and it is only slightly soluble in water. A fluid at 107° F. would drop very quickly in temperature when taken into the mouth.

Dr. Roberts.—Slightly tepid water would melt salol, and some women drink tea very hot. You think a tooth would not carry the heat from a mouthful of hot water up so as to melt the salol?

Dr. Kirk.—"Slightly tepid" is a relative term. Salol melts at 104° F., and it would not be affected by such means. I do not believe the temperature of the roots of teeth is raised under any circumstance to that degree when hot fluids are taken into the mouth.

Dr. McQuillen.—I have been using salol, and have been perfectly delighted with it. In regard to what Dr. Roberts said, the salol is sealed in the tooth thoroughly, and if it did melt it would not make any difference; besides, I do not see how it would be possible to keep anything hot in the mouth long enough to melt the salol in a root. If it did, it would crystallize again when the temperature became normal. I have never had anything that has pleased me quite as much in root-filling.

Dr. Curry.—Would Dr. Kirk use salol where the apical foramen was unusually large?

Dr. Kirk.—I cannot recollect having used it in any such case as that; occasionally we have cases of open foramen, but they are not usual. I do not think I should hesitate to use it.

Dr. Mascort has described the use of salol in a case where caries had perforated the floor of the pulp-chamber, exposing the periosteum of the alveolus. If it would operate successfully in such a

case, I see no reason why it would not in a case of open foramen, although it might be better to use a gutta-percha cone in connection with the salol.

Dr. Deane.—Would there be any danger in forcing salol through the apex where it was open?

Dr. Kirk.—I should not want to force anything through the apex. If I had to force anything through, I would prefer it to be salol to almost anything else of which I know; it must be used carefully and dexterously, so as to avoid any such action. That is an accident to be avoided in all canal operations.

Dr. Deane.—There are some roots through which we force medicine, for instance, in the treatment of a fistula.

Dr. Kirk.—I should prefer forcing a liquid medicament through in a case of that sort.

Dr. Deane.—After that would there be any danger in forcing salol through?

Dr. Kirk.—I should think not, if carefully used. Dr. Burchard uses a method somewhat different from that which I use. I use a Donaldson bristle to introduce the salol, first carrying the bristle to the apex of the root as nearly as I can; then with long pliers I carry the liquid up, and, having the broach in position as I introduce the salol, I slowly withdraw it so that I get the salol drawn into the space previously occupied by the instrument. There is a better chance by this method, I think, of carrying it to the apex. It can be readily pumped into a canal with a broach armed with cotton. It is a difficult matter to pump salol in liquid form vertically into a root-canal, but it will flow by capillary attraction, which carries it upward, so that we are reasonably certain that we have filled to the apex; that, of course, we never know absolutely until such a tooth is extracted and examined.

Dr. Guilford.—I have used salol in a way not mentioned by the previous speakers, and that is for the filling of root-canals in teeth about to be implanted. I recently used it in two cases of that kind, introducing the salt, by means of a fine heated wire, through the slightly enlarged apical foramen. It is so much easier of introduction in this manner than any other substance I have yet used for the same purpose.

Dr. Kirk.—Where I have used it in cases of filling roots of teeth for implantation, I have used a very small drill to enlarge the apical foramen and a hypodermic syringe to inject the salol into the tooth. By using a warm syringe and injecting the liquid salol into the root-canal from its apex, I believe it makes an excellent

filling for such purposes. I have only had these cases of implanted teeth thus treated under observation for a short time.

Dr. H. C. Register.—I want to place myself on record as having used salol. I have used it as an antiseptic, also in connection with phosphate of zinc. I mix it in crystal form with phosphate of zinc, and insert it just as I would the plain phosphate of zinc in a canal. All of these cases, where salol has been used in connection with desiccation, which I have always, for a number of years past, carried out, have given me very good results.

There was one case, which occurs to me, of a gentleman with a very small mouth, where I had to treat a second inferior molar, and had to approach the pulp-chamber from the buccal wall. I tried to fill the tooth, desiccating it first, with salol and phosphate of zinc, but I never could make a perfectly comfortable tooth of it. After I found that salol could be melted so easily, I decided to seal it up permanently with melted salol. Keeping the tooth dry and desiccating it thoroughly, this was done. The apex of the root was open so that it would sometimes bleed right through from the canal, and yet the salol root-filling has worked very satisfactorily.

I operated on this case, which had been a very troublesome one, and it has now been six or eight months and there has not been the slightest trouble with it.

In all these cases I use no gutta-percha. I simply, after desiccation, fill the canal and a part of the pulp-chamber with the dry crystals, packed down into the canal as tightly as I can pack the material with an instrument, and then apply a small nerve instrument, warmed slightly, which, as soon as it touches the salol, liquefies it. As it becomes heated the material will pass into the most infinitesimal space, and almost as soon as the instrument is withdrawn the salol solidifies into a hard, crystalline mass.

In putrescent cases I use heated air and desiccate thoroughly. I then do not hesitate to melt the salol right into the canals and fill the tooth. I have no trouble with the cases at all.

In answer to Dr. Guilford, Dr. Register stated that he mixed the crystals of salol with the oxide of zinc before combining the latter with the phosphoric acid liquid.

Dr. Kirk.—I would like to ask if any one has used formol, or formalin, as it is also called. Dr. Mascort called my attention to the use of it in the St. Louis Hospital of Paris, I think, by a surgeon there, who had, in connection with the public clinic, a great many cases of alveolar abscess, etc., which were treated almost indiscriminately with formol. I had sent to me a bottle of forma-

lin from Schering, of New York, and have been testing it in my work occasionally. At times I have found it a little too violent in its action, but by diluting it somewhat I get satisfactory results from it. Dr. Mascort, who suggested salol as a root-filing, was quite enthusiastic over the use of formal as a root-dressing for putrescent cases, and I am favorably impressed with its use in controlling putrescence and as an antiseptic. It is very penetrating. It is used in the hospital wards on the continent for spraying the walls, washing clothing, etc. The vapor makes a very efficient antiseptic; it is very penetrating when vaporized in a room, and a very small amount is destructive of germ-life. The odor somewhat resembles that of the allyl compounds,—onion, horseradish, mustard, oil, etc. It seems to me well worthy of investigation as a root-canal dressing.

Dr. Louis Jack.—Shortly after the use of formalin was suggested to me by Dr. Kirk, I made an application to a case which had been opened at the sea-shore during the summer. The dentist in charge of the case had made a mistake in the diagnosis, and assumed there was irritation in a certain tooth, and he destroyed the pulp and left the case open; the result was considerable disturbance in the apical region. The tooth had become so seriously affected that it would not allow closure; an ordinary cotton stopping would bring on, in a few hours, quite a serious disturbance, so I was obliged to leave it open and close it for a few hours only, and then open it. I employed a solution of formalin, diluting the ordinary solution to a five-per cent. solution, and on the second application I was able to close the tooth at once with gutta-percha, and in a few days afterwards filled it without any further disturbance.

I have also used it in cases where I formerly used hydronaphthol, but would warn any one against using it in a greater amount than five per cent. in pulp-treatment, on account of its irritating influence.

Dr. Roberts.—Is the practice to seal the formalin in the tooth, or is another dressing put in afterwards?

Dr. Jack.—In the case just reported, the only putrescent case in which I ever used it, I allowed it to remain in several minutes, then removed it, and applied aristol and gaultheria. I had previously applied aristol and gaultheria without any impression having been made.

Dr. Darby.—Does Dr. Jack think he would have had as good results if he had used hydronaphthol, or did he use it?

Dr. Jack.—I did not, as I would not consider it as active as aristol and gaultheria. I might state I have found formalin at ten per cent. quite an irritant.

Dr. McQuillen.—I would like to ask if any of the members have used Dr. Schreier's preparation, sodium potassium? I have been using it since September of last year, and the results have been so uniformly successful that I think with one exception it has never been necessary to again treat the tooth after thoroughly burning out or saponifying the putrescent matter in the pulp-chamber and canal. I have never had to use it a second time. One case I recall was sealed last September a year,—a lateral incisor in which the pulp-canal was positively filled with pus. It was the first case in which I used the Schreier preparation. That tooth has been sealed ever since, and that is only one of many cases.

Dr. Kirk gets the same effect, I believe, with sodium peroxide; but I have never used that, as this sodium potassium has helped me so fully. There is one objection to it. Unless you are careful not to use too large an amount, you are likely to have an explosion, the material going off like a fire-cracker, though no harm is done; only it causes a surprise.

Dr. Curry.—I have used it, but have lately abandoned it for sodium peroxide, as I like it better. It is easier to manipulate, and I get the same results.

Dr. Kirk.—There is a subject brought up by Dr. Burchard that has been passed over without discussion. If I remember correctly, in one of the early meetings of the Odontological Society there arose a discussion as to whether it was possible to have an abscess upon a vital tooth, and the meeting was considerably divided on that question. Dr. Burchard has called attention to a series of cases in which he had something similar to abscess on a vital tooth, the etiology of which he assigns to conditions of gouty or rheumatic diathesis.

I have had an exceptionally good opportunity, during the past ten days, to observe the whole period of inflammatory action of this character in the shape of an abscess in my own mouth. Two Sundays ago, and for some time afterwards, I was unable to get my jaws together, because of inflammation associated with a lower third molar. The inflammation was distinctly localized in the gum, on the buccal aspect of it. So far as I could determine by the sensation, by probing, etc., the inflammation was probably half-way down the side of the buccal aspect of the root, and accompanied with pain that almost incapacitated me from work for

the time. It is such a pain as any one who has had an alveolar abscess knows a great deal about. There was only slight swelling. It was distinctly associated with general gouty or rheumatic symptoms. I passed a blunt probe around the gingival attachment, and found its margin absolutely perfect. There was no break in it, that I am morally certain of. In course of time the abscess broke, and pus discharged from it. There is now a pocket on the buccal side of the tooth, and I have no doubt it will be, in the course of time, the seat of a pyorrhœal condition, because that is a difficulty I have to continually combat.

I have the same condition repeated in an upper cuspid in my own mouth, and it may be of interest to Dr. Burchard to know that it also was coincident with a considerable manifestation of a rheumatic character. That is in my own individual case. The best way to know a thing is to know it by personal experience.

I have an exact duplicate of that case in the mouth of a lady patient of mine, excepting that the inflammation was associated with a lower second molar. I found exactly the same condition progressing there. The period through which the inflammation ran was about a week all told. I examined the gingival margin carefully, and found no break. It was a vital tooth. I, however, removed a large filling for the purpose of determining that. I was not satisfied with sensitiveness to thermal test. I wanted to test the responsiveness of the dentine, and I found a vital pulp, and still an abscess formed on the buccal side of the tooth. There is now a large pocket extending from the gingival margin almost to the apex of the root, discharging pus freely. It has been washed out and treated, but still there is an exudation.

I report these two cases because they have both been under my observation, and one of them will, I hope, continue to be for a number of years to come; and I believe there will be a record of pyorrhœa following this acute inflammatory outbreak unless that condition is cured in the mean time.

It seems to me that in these cases we have almost certainly the original lesion which induces the pyorrhœal condition. I do not maintain that what I have described is the only source of pyorrhœa, but I strongly suspect it to be the origin of one variety of it.

Dr. Deane.—I had a case a few days since in which the condition of pyorrhœa is very apparent: a discharge of pus in connection with the lower first molar on the right side, and the bicuspid on the left. I found on the lingual side of the lower right central a condition that led me to believe there was pus there, but no open-

ing in the tissue leading down to the pus collected around the root of the tooth. I filed a broach off very thin, and passed that down around the tooth until I could feel the process, but I could not come in contact with the pus; but by opening up the sac from the lingual side I got quite a discharge of pus, and found I could pass a probe in right to the surface of the root. I believe that pus formed there without any possible chance of an opening around the cervical border of the tooth. I have placed the patient under the treatment recommended by Dr. Peirce, and shall watch the case carefully from time to time. I believe the tooth to be a vital one. No cavity in it at all; it responds to all the tests, heat and cold, etc.

Dr. Truman said he was somewhat sceptical on the point.

Dr. Cryer.—I do not see why we could not have such abscesses. The tooth can be alive and have an abscess in the immediate neighborhood. An abscess connected with a dead tooth-pulp would be, generally speaking, a dental alveolar abscess; that, of course, would involve the apex of the root. I do not see, however, why we could not have a live tooth and an abscess along the alveolar border.

Dr. Gaskill.—I had a case in which I got myself into trouble by a condition of that kind; a patient presented herself having a fistula between the first molar and second bicuspid, and I could not determine from which tooth the trouble arose. Both seemed somewhat sore and responded to the tests applied; finally determining to try the molar, I drilled into a vital pulp; I then drilled into the second bicuspid and found a vital pulp there, and had to destroy the pulp in the first molar, but was able to save the second bicuspid. The fistula was healed by systemic treatment. Afterwards the patient presented herself with a similar condition on the other side of the mouth.

Dr. Truman.—I question if proper discrimination is made between vitality of the roots; there may be vitality in one root, or even in two roots in the superior molars, and yet one be entirely dead; that very often occurs. In that dead portion of pulp abscess will occur; sooner or later pathogenic germs will find their way into that point.

When any one talks about an abscess at the root of the tooth without an opening, or that the tooth is entirely vital, I should want to know whether all the roots are vital. One may be dead and the other fully vital.

Care should be used in making this discrimination. I have no belief that abscess could occur near the apex of the tooth, and the tooth, or that root, retain its vitality.

Dr. Kirk.—In my own mouth there is not a dead pulp anywhere.

Dr. Truman.—Have you taken the tooth out?

Dr. Kirk.—No, I have it there now, and know that the pulp is alive. The tooth has no cavity in it.

Dr. Roberts cited a case of abscess on apparently sound teeth.

Dr. Curry described a case where he had drilled into a supposed dead pulp in order to treat an apical abscess with fistula, and had found the pulp entirely alive.

Dr. Jack mentioned having drilled into what he supposed was a dead pulp, but found it entirely alive, and said that twenty years ago he would not have believed as he now does, but he has seen so many cases that he is confident they do exist more commonly than some suppose.

Dr. Register.—Some years ago, before *Dr. Peirce* drew the attention of the profession to the fact that pyorrhœa alveolaris had some connection with rheumatism or gout, I knew that I had rheumatism. I also knew that I had erosion of the teeth, and I knew I had what was called Riggs's disease of the gums.

Several years ago, in connection with a lateral incisor which I still have in my mouth, a small abscess formed on the root about half-way between the gingival border and the apex. It was extremely painful, and it struck me as being singular that such a condition should exist, for I felt sure the pulp was alive. I never had had trouble with it to any extent, other than that it was a little loose. I tried to open the abscess from the cervical margin, passing an instrument up the line of the tooth-root, and was unable to reach it. I then slipped a lancet into it through the gum, and a small quantity of pus flowed out; since then there has been a recession of the gum up to the point where the pocket was formed. I am quite positive there was previously no opening in the gum margin, because I examined it with a mirror and instrument, and could see perfectly what I was doing. The pulp in that tooth is still alive.

Adjourned.

GEORGE D. B. DARBY,
Secretary.

Editorial.

THE LOYALTY OF SOCIETY MEMBERS.

It may be held that the principal purpose of dental association is educational. While there are other influences which are beneficial, particularly the attendant social intercourse, it must be conceded that the advancement in the study of scientific principles, the acquisition and relation of facts, and the understanding of practical procedures are the chief ends in view.

Each society in a certain sense is representative of a human mind. If it pursues its work with the definite purpose of carrying out these fundamental objects, it acquires an individuality and character of its own. Where all are animated by the same spirit and determination to work for the benefit of the society, the greatest development in its growth will take place which its members are capable of giving to it.

This statement involves the principle that each member, and particularly those best endowed by natural capacity and acquired ability, should give to their local society their entire work in any given direction, otherwise the society is being deprived of strength and sources of growth.

Should those capable of investigation and those of clearest intellects carry their mental work to distant organizations the result is the weakening of their own society, as they are clearly depriving their associates of the benefit of the analysis and discussion of the matter.

The discouragement of having original matter with its inspiring influences coming back as secondary from some other source through publication must be depressing in its effects upon the life of any body of men.

There has grown up a practice in this country somewhat peculiar to dental societies, to induce the papers brought before them to come from leading men of other societies. Two inevitable results must be the consequence of this course,—the society from which the essayist comes is deprived of the influence upon it of the original matter to which it is entitled to have the precedence, and the society before which it is given, while it may be stimulated by a

representative person in their midst and benefited by the matter, has taken a dangerous course.

This produces a species of intoxication which in its reaction weakens those who indulge in it. This is exemplified in other than dental societies. It has been stated that clubs which for intellectual purposes employ lecturers to give entertainment and instruction fail to have the same mental vigor as those which depend upon the talent within their own body. It has also been remarked, concerning some of the dental societies which have depended upon outside papers, that their members do little efficient work. To reiterate, this practice robs in both directions,—it weakens the body from which the teacher hails, and it ultimately reduces the life of the society which receives. It revives the old homely maxim, "Every tub should stand on its own bottom."

It may not be difficult to make it appear that the dispersion of efforts complained of effects the general status of the dental profession.

The dental societies of this country are arranged in three groups, the local, the State, and the national. It is evident these should work in harmony and interdependence with each other, the result then would be that scientific and practical advancement would have at last its most efficient expression in the proceedings of the national association. The representative gatherings of the profession give higher tone and should furnish stronger claims upon the public interest than the local societies. To give these satisfactory and continuous interest all advanced work should there have final consideration. The discussion would then have a wider range and be subject to the determination of the more experienced members of the profession. At present new methods and new remedies are exploited and widely put in practice, upon the authority of individuals, without the previous discussion necessary to put them into digestible form; witness, for examples, the pernicious wave of copper amalgam, and that remedy after remedy is brought forward for given purposes, each laid aside by the mass for the next, before its properties and mode of application to dental surgery have been clearly made out. It is our belief that this is another of the evils of diffusing efforts under conditions which restrict the winnowing and discussion which every paper and subject should have at the place and time when its real value could be made clear.

As it is to-day, the national association is woefully deficient of papers upon new subjects, and until those who represent the local and State societies bring up to it their work for final discussion it

will continue to be lacking of vital interest. It should be a paramount object to sustain the character of the national association, because its proceedings qualify the world's opinions of the status of dental science and practice in this country, and should furnish a criterion for the guidance of all. We therefore hold it a necessity that each society should carefully consider all subjects brought before it, and send up its original matter to the national association to which it is related. This, as before indicated, involves the obligation that the members of each society be so loyal to its welfare as to give to it their whole mind and support.

L. J.

ENTRANCE EXAMINATIONS TO DENTAL COLLEGES.

THERE are among dental teachers and writers men who lay much stress upon the entrance examinations for students, some putting it as high as a classical education. Indeed, in a recent editorial directed to the dental colleges in one of our contemporaries, such a plea was made.

This has always seemed to us a mistake. Of course, it is desirable that our classes should be composed of as good material as possible; the student should have at least a common-school education, and sufficient intelligence to comprehend the lectures and appreciate the value of his instructions and of time. There are men in every school who are not brilliant scholars, nor do they reach a very high mark in clinical work, though they may be earnest and persevering workers; but if their moral character be beyond reproach, they will fill their place in the activities of the world. In going into certain communities they will be appreciated, and possibly make a greater success of their-life work than some more scholarly man would in the same field.

The editor of the *Odontographic Journal* strikes the key-note of this subject when he says, Shall the standard be nailed in place by men of affairs, or by men as impracticable as learned tariff reformers, who read a little Latin very badly and less Greek worse?

Standards should be fixed by men of breadth, men capable of seeing that standards and standard-bearers imply standard supporters. One may recite languages either living or dead, likewise the contents of his Gray's Anatomy and other voluminous text-books, and yet fail utterly in his attempts at practical work. As Professors Peirce and Taft have expressed it, what we want is "a reasonable

degree of scholarship." This means that men should not be kept in preparatory schools and colleges studying the fantastic courses which some of them present until the plastic stage is past.

If the entrance examinations should be such, as some, especially our English brethren, claim, as to keep out nearly every one but college-bred men, we should be sorry for the dental profession. Had this been the practice in years gone by, many of our very ablest teachers and representatives of to-day would not be found in the ranks. Far more important is it that more attention be given to the examinations throughout the course, especially the final one; not granting diplomas to men who it is known would be a discredit to their respective schools and to the profession.

It is unreasonable to expect our students, coming as many of them do from the rural districts, to be polished, scholarly men. True it is that there are among them men who are better adapted for other vocations; however, if they knock at the doors for admittance, our schools should not refuse them entrance (unless, of course, there is a good *moral* reason why they should not enter the profession), but should, by giving each one thorough, conscientious training, instruction, and care, endeavor to develop such men as will fill their places in the field of dentistry with credit.

The importance of moral worth or character of students has never, to our knowledge, had any bearing upon the entrance qualifications, and herein lies the secret of much discredit that has come upon the profession. It has frequently been asked, why dentists in many cities do not receive the same social recognition that is given representatives of other professions, and in many cases, if not all (if the truth were known), the answer would be, "Not from a lack of intellectuality, nor from want of skill as a dentist, but owing to the low moral fibre of the man."

Is it not time that the moral standard should be raised? The popular cry seems to be, "Raise the standard," but had we not better see to it that this embraces ethics and morals?

That there are throughout the land so many representatives of unsavory character is largely due to the lax conditions and requirements in this direction in our schools. Let no man hold a diploma from a reputable college unless he is an honorable, temperate, manly man.

G. W. W.

Bibliography.

MANUAL OF OPERATIVE TECHNICS. A Practical Treatise on the Elements of Operative Dentistry. By Thomas E. Weeks, D.D.S. Published by H. D. Justi & Son, Chicago, Ill., 1894.

The need of a more systematic course in dental procedures was long ago clearly demonstrated to the teachers in dental colleges, and there has been an intelligent effort in this direction in nearly all the higher class schools to attain this end.

The difficulties to be surmounted multiply in proportion to the size of classes, and the general inadequate provisions made for large numbers. The prevailing idea that the subjects and modes of treatment detailed in this book have had their origin in recent years is a mistake. This may have been true of some schools, but others have quietly originated plans leading directly to the same results as Dr. Weeks has so admirably described in this valuable book.

Dental college education has been a gradual development, but while slow the changes have been constant, so that it is not surprising that we find graduates of even ten years writing of things as they existed when they were students as though they still continued as part of the curriculum of the present.

The author of this volume evidently realizes this, for he says in his preface, "The desire to be helpful to both teacher and student has been the constant motive, and I hope . . . that the principles are so represented that all teachers may use them as a basis for their own particular methods."

While it is recognized that silhouettes are very valuable as a means of instruction, it seems to the writer that more stress is laid upon these than is warranted. The time spent in cutting down teeth and mounting them might be better employed, after one or two have thus been prepared, in some other and more instructive work. The charts made fully answer the purpose, as it is impossible to see the gain to the student unless it be in manual dexterity in the use of saw and file.

"Steel and instruments" are fully described in Chapter II., together with their uses.

The personal instruction given in Chapter III., on "Canal Treatment," is exceedingly valuable, and if it be not already adopted in

colleges should at once be made part of the demonstrator's work. This applies with equal force to pulp-treatment, capping, etc., very clearly described in the chapters devoted to these subjects; but practical experience leads the reviewer to regard preliminary training, beyond practice in the use of tin in operative dentistry, unnecessary if not useless, and, with large classes, impracticable. From this point on the studies should be upon the living subject.

The manipulation of foils can be taught out of the mouth by the use of tin-foil, and we entirely disagree with the author in his estimate of this metal. He evidently does not comprehend its qualities, for he says, "For introduction into cavities strips of foil are rolled in a napkin, twisted into ropes or *folded* into ribbons, etc." Now, in the opinion of the writer, this is exactly *the way it should not be used*. Further, he says, "Its homogeneity depends upon wedging or interdigitation." This is a positive error, for tin-foil is capable of cohesion, and it is this property that makes this metal so valuable to the teacher in preliminary work. The management of cohesive as well as non-cohesive gold can be explained by it.

The remarks made in regard to silhouettes applies with equal force to drawing of teeth and modelling in clay. The student can acquire the forms of teeth just as well in practical experience. Our observation of the results of drawing and modelling by students, previously untrained in these branches, has been, as a rule, very far from creditable as a reproduction of form, the point aimed at in this work.

The aim of the book to develop a higher standard of preliminary training is beyond all praise, and while enthusiasm has naturally run to extremes in this technical work, it will have a positive influence for good upon all the colleges of the country, in that it will crystallize thought of many educators in this direction.

SAMMLUNG VON MIKROPHOTOGRAPHIEN ZUR VERANSCHAULICHUNG
DER MIKOSKOPISCHEN STRUKTUR DER ZÄHNE DES MENSCHEN.
Herausgegeben von Dr. dent. surg. A. Gysi und Dr. Med. C.
Röse. Zürich, Schweiz. (Microphotographs of Dental His-
tology.)

There has certainly been nothing presented in the way of dental histology equal to these plates. As a piece of photographic art work they seem to be beyond criticism, and in the representation of detail in dental tissues nothing to be compared with them has been presented. Indeed, in a histological sense, the views of some portions of the minute structure of dentine is a surprise, especially

in the clear presentation of the prolongations of the odontoblastic layer, Neumann sheaths, and Tomes's fibres.

The photographs are on enamelled bromide paper 7 x 7 inches square, and are pasted on thick card-board 11 x 16 inches. Each photograph is accompanied by a lithographed reproduction, with explanatory notes in German and English, so that teachers desiring these for class work will experience no difficulty.

The following is the list of subjects treated in this portfolio.

1. Upper Canine of Man with Pulp. Longitudinal ground section, prepared after Von Koch's petrifying method,—thirteen diameters.

2. Pulp from the Crown of a Human Superior Molar, showing the distribution of the nerves and blood-vessels; specimen colored with osmic acid. Longitudinal ground section after Von Koch's petrifying method,—thirty diameters.

3. Follicle of First Milk Incisor and the Germ of the Permanent Incisor, from human foetus (thirty centimetres long); frontal section through the decalcified lower jaw; specimen colored with borax-carmin and bleu de Lyon,—fifty-five diameters.

4. Odontoblasts and Dentine, from the incisors of a new-born cat; specimen colored after Mährenthal's method (pyroligenous acid),—six hundred diameters.

5. Odontoblasts and Connective-Tissue Cells, from pulp of the crown of the first upper molar (child fourteen years); prepared from a decalcified longitudinal section through the crown, colored with hæmatoxylin,—six hundred diameters.

6. Odontoblasts, showing Tomes's Fibres entering the Dentinal Tubules: ground after Von Koch's petrifying method, specimen colored with acid fuchsin,—eight hundred diameters.

7. Dentinal Tubules and Interglobular Spaces, from a ground section through the crown of an incisor of man; specimen colored after Golgi's method (chromium silver),—five hundred and fifty diameters.

8. Gelatine-Yielding Fibrils of the Dentine, from a ground section through the root of a bicuspid of man; specimen colored after Golgi's method (chromium silver),—seven hundred diameters.

9. Dentinal Tubules from a First Molar (child of seven years). Transverse ground section, showing Neumann's sheaths of the dentine tubes and the enclosed Tomes's fibres; specimen colored after Golgi's method (chromium silver),—sixteen hundred diameters.

10. Transverse Ground Sections through Enamel (of man), four photographs of nine centimetres square, from an incisor and a molar,

—three hundred, six hundred, twelve hundred, and twelve hundred diameters.

11. Enamel of a Human Molar, showing the "stripes of Schreger," and the brown "parallel stripes of Retzius;" from a longitudinal ground section.—one hundred diameters.

12. Dentine, Normal (transparent) Cementum and Cementum of Hypertrophic Character; from the root of a human molar. Longitudinal ground section, treated with bichloride of mercury.—four hundred and twenty-five diameters.

The price of this portfolio is fixed until February 1 at six dollars, or thirty francs. The collection was received too late to enable our readers who may wish it to take advantage of this time limit, but by applying to Dr. Alfred Gysi, Zahnarzt, Börsenstrasse 14, Zürich, Switzerland, they may be able to secure it at a slight advance on this price.

Teachers in dental colleges should have this collection, and it would be exceedingly valuable in private offices as a means of instruction to patients.

This is the first portfolio, and is issued partly as an experiment. If sufficient encouragement be extended others will follow. The expense of such an undertaking is necessarily great.

A COMPEND OF DENTAL PROSTHESIS AND METALLURGY. By George W. Warren, D.D.S. With One Hundred and Twenty-nine Illustrations. P. Blakiston, Son & Co., Philadelphia, 1894.

Dr. Warren is becoming a prolific writer in certain fields of dental authorship, and has rapidly followed his "Compend of Dental Pathology and Dental Medicine" with "Richardson's Mechanical Dentistry," revised and rewritten, and now presents to dental readers, through the publishers, P. Blakiston, Son & Co., this compend of Dental Prosthesis.

It cannot justly be regarded as a compend, as that word is ordinarily applied, for it is rather a condensed statement of mechanical operations prepared in a form for ready reference.

The brevity required to accomplish this tends frequently, as in all compends, to obscurity. This is illustrated in the description of the investment of a piece in plaster and sand. "It is customary to incase the piece in the plaster mixture to the depth of from one-half to three-fourths of an inch, leaving only the lingual surface of the plate and teeth uncovered." As this is a very important part of the process a fuller explanation would have been better.

The same criticism may be applied to the "soldering process."

In the experience of the writer there is no part of mechanical dentistry that has given him more trouble in teaching than this, and it not infrequently occurs that students fail to acquire it. This may seem strange, as the philosophy of the operation is very simple, and should be readily comprehended. A full chapter on this would not be labor lost in future editions, for the process as explained in this would, it is feared, lead the inexperienced into difficulty.

We have not space to follow the author through mechanical dentistry proper, crown and bridge, continuous gum, and finally through an admirably condensed chapter on dental metallurgy, but it can safely be said of the book that through its two hundred and sixty-two pages there is apparently a continuous effort to make this a daily companion of the student,—a text-book always available for ready reference.

The author might in future editions enlarge on important matters to advantage and reduce on others; for instance, the space so generously given to "temperament" might be abbreviated very materially, as its value to students as a guide to the arrangement of teeth is very questionable.

BROOK FARM. HISTORIC AND PERSONAL MEMOIRS. By John Thomas Codman. Arena Publishing Company, Boston, Mass., 1894.

Very few of our readers, it is imagined, have not at some time been interested in the frequent allusions in general literature to "Brook Farm," and have desired an opportunity to make themselves familiar with its history. It is a gratification to know that one of our number, a Brook Farmer in his youth, has prepared this most readable volume to meet this growing demand.

The fact that some of the brightest of men and women of New England were residents and active workers on this farm is sufficient reason for noticing a book devoted to its history in a purely professional publication. The great difficulty with the professional or business man is that he becomes narrow by the contracting force of his special training, and needs the broader humanitarian outlook that such a publication gives to freshen his life.

It was fortunate for Dr. Codman that his early boyhood was spent at this place, as it enabled him to give to the world the only detailed and satisfactory account of the life on that now celebrated farm. The only regret felt on reading this interesting book is that the author has too little to say of the men and women who made it famous. This is probably due to the fact that he was very young

when he became one of the Farmers, and then the majority of those enrolled as members at that time had their reputations to make.

Rev. George Ripley was the founder of Brook Farm, but it had its real origin in that upheaval of the moral and religious life so marked in the period from 1836 to 1846. Ripley became subsequently one of the principal editors of the *New York Tribune*, and the writer recalls with pleasure the eagerly sought-for reviews from his pen.

The men and women who took a more or less prominent part in this work, and became the leaders of thought at a later period, may be mentioned: Hawthorne, Thoreau, Emerson, Channing, Orestus A. Brownson, Margaret Fuller, George W. Curtis, Theodore Parker, and Charles A. Dana. The latter still survives, and is the active chief editor of the *New York Sun*. After Mr. Ripley's death Dana wrote of Brook Farm as follows: "The healthy mixture of manual and intellectual labor, the kindly and unaffected social relations, the absence of everything like assumption of servility, the amusements, the discussions, the friendships, the ideal and poetical atmosphere which gave a charm to life,—all these continue to create a picture towards which the mind turns back with pleasure."

We have not space to quote the good things Dr. Codman has gleaned from experience, notes, and memory, to make this very readable book, nor would that be necessary, dealing, as it does, with a phase of experience peculiar to the transcendental period of the middle life of the present century.

The author has no sympathy with the idea that "associations" are unfit for women, for he says, "It has been asserted that associations and communities may do well for men, but that women can never get along in them. The experience of Brook Farm testifies against the assertion. If ever there was a clear record of faithfulness and devotion, of sacrifice, of love of principle, and earnest, unselfish work for unselfish ends, the women toilers of Brook Farm can claim it and secure it without cavil."

It seems to the writer that the perusal of such a book is something more than a mere detail of daily, weekly, or yearly experiences in a community, but that it reaches out to an inspiration and incentive to a broader and more unselfish life than the world generally presents. The men and women who organized the Brook Farm movement have ordinarily been regarded as dreamers in their day and generation, and while this, in a degree, might be regarded as true, they, with self-sacrifice, attempted to demonstrate to an unbelieving world, in the language of John S. Dwight, that "the

organization of attractive industry will be the reconciliation of spirit and matter, of religion and the world," and if this be true, Brook Farm and the communities that grew out of it were but practical pictures of the conditions of the human race for ages to come, for the future of civilization must approach this condition, if it is ever to outgrow the semibarbarism of the present.

A COMPEND OF MATERIA MEDICA, THERAPEUTICS, AND PRESCRIPTION-WRITING, WITH ESPECIAL REFERENCE TO THE PHYSIOLOGICAL ACTION OF DRUGS. By Samuel O. L. Potter, M.D., M.R.C.P.L. Sixth Edition, Rewritten and Enlarged. P. Blakiston, Son & Co., Philadelphia, 1894.

This compend has been fully reviewed in former editions, and we can only repeat our former good opinion of it as one of the best condensed statements of fact upon the subjects considered now in the market. Compend has their objections, and they are serious, inasmuch as they tend to superficial work, but for easy reference and refreshers of memory they have a value oftentimes superior to larger works.

The book has been enlarged by the addition of seventy-five additional articles, among these chloralamide, hypnal, hydrogen dioxide, phenacetin, phenocoll, etc., bringing it into conformity with the seventh revision of the United States Pharmacopœia (1890).

Current News.

ANNUAL MEETING OF THE INTERNATIONAL DENTAL PUBLICATION COMPANY.

THE annual meeting of the International Dental Publication Company took place at Jersey City, on January 26, at which the report of the board of directors was received and the election of officers was held.

From the report it appears that the financial interests of the journal have not suffered from the general business depression as had been anticipated, the residue of income having been considerably greater than for the previous year.

It was expressed that the profession has not met the laudable and energetic efforts made to supply the profession with an in-

dependent journal with the amount of support to which the board believed the INTERNATIONAL DENTAL JOURNAL, from its merits, to be entitled. They state it has become evident that the conduct of the JOURNAL in a business direction must become more active. In agreement with this impulse an appeal is being made to the leading dental societies to take some action towards influencing subscriptions for the JOURNAL on the ground that it belongs to the profession, and that it should for this reason be loyally and amply sustained.

We quote from the editor's report,—

"The result of the year's work is certainly in many respects remarkable. From the best authorities it is learned that the past year, 1894, was the most trying year periodicals of all kinds have experienced, and a journal that could hold its own and show no deficit was regarded as doing very well. As our journal has done more than this, it may be regarded as exceptionally successful, and should be held as firmly established.

"The present period of depression will necessarily be slowly dissipated, but following the general law of all crises in the financial world, it cannot well last over another year, and possibly the present may show a marked improvement. It must be regarded, therefore, as certain that we have passed the most difficult period, and with persistent economy we ought to reach finally the open sea of successful journalism.

"It is regarded now as the only exponent of independent dental thought conducted upon a high standard of matter and character of production. It is possible that some may have been disappointed, that it has not waged war on trade influences. In a quiet way the JOURNAL has been a serious obstruction to the complete success of certain trade journals. This has been made evident in many directions. It is thought that, for the present, the best line of antagonism to these journals lies in thorough work and a quiet influence with societies to rise to the standard of higher professional spirit.

"The evil influence of trade has so permeated the entire body that any mere series of editorial denunciations will not avail. The body must be educated to a higher life, and this will take time and persistent effort.

"It is with this view that the editor has refrained from any direct attack on trade organizations for their manifest interference with the best interest of the profession. It is, however, his opinion that we are fast approaching a time when it will be necessary to strike more decided blows in this direction.

"We cannot close this report without expressing our most grateful thanks to those of the stockholders who have earnestly and persistently stood by the JOURNAL. To the societies who have continued to give it their proceedings, in the face of continual financial offers from capital, the JOURNAL company should express in proper terms its appreciation. The *editor* appreciates this, perhaps, more keenly than others, as he is constantly brought in contact with the under current of competition from capital that, but for the brave opposition of some societies, would be discouraging. So far there has been no break in the band of faithful colaborers,—the New York Odontological Society, Academy of Dental Science, Harvard Odontological Society, Odontological Society of Pennsylvania, and the recently added Academy of Stomatology. The Central Dental Association of Northern New Jersey has contributed largely but not regularly."

The following officers were elected for the ensuing year:

President, Louis Jack; Vice-President, Benjamin Lord; Secretary, George S. Allan; Treasurer, C. N. Peirce.

Advisory Board.—E. T. Darby, D. N. McQuillen, S. G. Perry, W. W. Walker, J. A. Woodward, *Chairman*.

Board of Directors.—George S. Allan, New York; R. R. Andrews, Cambridge; J. N. Crouse, Chicago; Edwin T. Darby, Philadelphia; J. Morgan Howe, New York; Louis Jack, Philadelphia; V. H. Jackson, New York; H. J. McKellops, St. Louis; D. N. McQuillen, Philadelphia; C. N. Peirce, Philadelphia; S. G. Perry, New York; W. H. Potter, Boston; W. W. Walker, New York; C. A. Woodward, New York; J. A. Woodward, Philadelphia.

THE HORACE WELLS PERMANENT MEMORIAL, UNDER THE AUSPICES OF THE AMERICAN DENTAL ASSO- CIATION.

TO THE DENTAL PROFESSION OF AMERICA:

THE Central Executive Committee, appointed by the president of the American Dental Association, is as follows: Dr. James Truman, Dr. Wilbur F. Litch, Dr. S. H. Guilford, Dr. E. C. Kirk, Dr. J. D. Thomas, chairman and treasurer.

This committee has been completed in its organization by including in its membership the presidents of all dental societies throughout the United States.

It is hoped to secure enough money to erect a bronze statue of Horace Wells in the national capital. The details as to style and character of the statue, as well as its definite location, will be decided upon at the next meeting of the American Dental Association, to be held at Asbury Park, N. J.

The committee takes pleasure in calling your attention to this opportunity for doing an act of justice to the memory of a worthy member of our profession, whose discovery has been of such incalculable benefit to humanity, and which has been so great an honor to our profession. You are invited to contribute whatever amount of money you may feel able and willing to donate to the fund, and to use your influence towards bringing our plan to a successful issue in a manner befitting the object.

Contributions may be sent by any member of the profession through the president of his local society, or direct to the treasurer, Dr. J. D. Thomas, 912 Walnut Street, Philadelphia. An official receipt will be issued by the treasurer for all contributions. The full list of contributors will be embodied in the pedestal of the memorial.

J. D. THOMAS,

Chairman of the Central Executive Committee.

The Executive Committee requests that all who desire copies of the souvenir volume of the meeting held at Philadelphia, December 11, 1894, in celebration of the fiftieth anniversary of the discovery of anesthesia by Horace Wells, will promptly forward their names to the chairman, in order that the number of copies to be printed may be determined upon. The price has been fixed at \$1.50 per volume, postage free to all parts of the United States; foreign countries at regular postage rates.

FIRST DISTRICT DENTAL SOCIETY OF NEW YORK.

An all-day clinic will be held under the auspices of the First District Dental Society of New York, on Tuesday, March 12, at the New York College of Dentistry, 205 East Twenty-third Street, New York City.

A cordial invitation is extended to all members of the profession to be present. Any one desiring to clinic, or exhibit anything of value, is requested to communicate with the committee.

JAMES G. PALMER,

Chairman Clinic Committee.

18 WEST THIRTY-FIFTH STREET, NEW YORK CITY.

Notes and Comments.¹

TRUE CULTURE.—It is not always the men or women who are acknowledged leaders in society, nor those who are masters of any special science, or can best master a college curriculum, who are the most cultured, but those who are masters of themselves, without bias or bigotry, ready to fulfil the duties of life with an earnest purpose to make the most of themselves and of the society of which they are a part.

True culture is the enlargement of our faculties, with an aim to make life fuller of all that is true, good, and useful.

THE APPLICATION OF CHLORIDE OF ETHYL.—A contributor to the *Lancet* calls attention to the fact that the vapor of ethyl chloride, when inhaled, is not free from injury. He cites a case where, after applying the liquid for a short time, "the patient stopped breathing, turned pale, slightly livid, looking very like a person under nitrous oxide gas." The writer then states that he will certainly not use it again where it is possible that the vapor can be inhaled.

We have had a large clinical experience with ethyl chloride, having employed it as a local anæsthetic since it was first placed upon the market, and while in a few cases, where the vapor was freely inhaled, symptoms of general anæsthesia were shown,—the effects of the chlorine,—nothing in the least alarming has been seen. We soon learned that by directing the patient to breathe entirely through the nose, and protecting this organ by bringing the edge of the napkin in front of it, this unpleasant feature was overcome. We feel no hesitancy in saying that for all minor surgical operations, especially such as the dentist is called upon to perform, chloride of ethyl is the safest and most efficient local anæsthetic extant.

Dr. Louis Jack, in writing us upon the subject, says, "I have found by experience that it is superior for producing refrigeration in extracting teeth and roots, and in implantation, to the usual modes of inducing local anæsthesia by ether or rhigolene."

¹ The assistant editor solicits contributions for this department,—new methods, new remedies and formulas, or any short practical note which may prove of value to the practitioner or student. Address 1718 Walnut Street, Philadelphia.

THE International Dental Journal.

VOL. XVI.

APRIL, 1895.

No. 4.

Original Communications.¹

GOUTY PERICEMENTITIS.²

BY EDWIN T. DARBY, M.D., D.D.S., PHILADELPHIA.

MR. PRESIDENT AND FELLOWS OF THE ACADEMY,—It is often easier to describe a thing than to give it an appropriate name. In the present instance, I am much like the preacher who has prepared his sermon and then fails to find a text to fit it. I am aware that of late the gouty diathesis has been made to stand as godfather and sponsor for nearly all the ills that flesh is heir to. Malaria has been receding into the background and gout and appendicitis are coming to the front. These diseases may not be more prevalent to-day than they were fifty years ago, but science has made such strides that the ability to diagnose them is made easier and their cure more certain. I have not come to you to-night with a new disease and an old name, but rather with an old disease and a new name, and my excuse for doing so is that I cannot find in our present terminology one that seems exactly adapted to the condition which I wish to describe. Gingivitis, phagedenic pericementitis, infectious alveolitis, calcic pericementitis, pyorrhœa alveolaris, and Riggs's disease are all well enough in their way, and some of them are sufficiently correct to be allowed to remain in

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the Academy of Stomatology.

use. Each of these, as I understand it, is intended to describe a disease which has its beginning at the gingiva, and not near the apex of the roots of teeth. It is not my purpose this evening to enter largely into the physiology, pathology, or even etiology of the diseases under consideration. Another has done this much better, I am sure, than I could do it, and I shall take the liberty of quoting somewhat largely from the admirable paper by Professor C. N. Peirce, and appearing in the INTERNATIONAL DENTAL JOURNAL, April, 1892, and January, 1894. He says, "The pathological state affords the only true basis for a scientific classification of diseases. The term pyorrhœa alveolaris refers only to one symptom, and is, therefore, provisional, and more or less objectionable. As you are aware, Dr. G. V. Black has, with some degree of appropriateness, applied to the disease under consideration the terms gingivitis or phagedenic pericementitis and calcic pericementitis. While these two terms approximate the truth, they do not, to my mind, express the whole truth. From a careful study of the abnormal alveolo-cemental membrane, it appears to me that we must recognize two closely-allied but yet very different pathological states; different, as I shall attempt to demonstrate, in their *etiology*, in their *clinical history*, in their *symptomatology*, and in their *susceptibility to treatment*. . . . In the first place, I believe that while pericementitis is associated with calcic deposit, the origin of the calcic salt and the antecedent condition which determines the locality and character of the deposit, as well as the train of totally distinct symptoms which follow, lead inevitably to the conclusion that the different diseases have thus far been confounded. In one form of pericementitis the origin of the calcic salt is the saliva, and in the other form the blood. The former I shall designate as *ptyalogenic* calcic pericementitis, expressive of the idea that in its origin it is *local*, *peripheral*, and *salivary*. The latter I shall designate as *hamatogenic* calcic pericementitis, . . . an altogether distinct affection from the preceding, and dependent for its cause upon some morbid material derived from the blood, which will, I think, become apparent from the facts which I hope to adduce." The author from whom I am quoting is to be congratulated upon the nice distinction which he has made and the terms which he has applied to the source from which these deposits arise. Again he says (referring to the hamatogenic variety of calcic pericementitis), "that in this form of the disease the morbid process begins on the root, and very frequently, if not usually, in the vicinity of the apical extremity, this being in marked contrast to the ptyalogenic form, which always has its

origin at the gingival borders." I think it may be said to be generally admitted that two distinct forms of calcic deposits are to be found upon the teeth, the one salivary, the other serumal, or, as Dr. Peirce terms it, hamatogenic. It is believed by many that the last-mentioned variety is often deposited at or near the apices of the roots of teeth before any lesion or pocket has been formed at the gingivæ. Again, it has been claimed by some that the hamatogenic variety is an irritant, and is the cause of one form of pyorrhœa alveolaris, and not the sequence,—in other words, that it antedates the inflammation instead of being the result of the inflammatory condition. The alveolo-cemental membrane is a connective tissue, fibrous in character, exceedingly vascular, and resembling the connective tissue found in articulations and joints in other parts of the body. Its function is not unlike that of other connective tissue, and experience has shown that it is susceptible to the same morbid influences. Observation has shown that few teeth are lost from any form of pyorrhœa alveolaris before the thirtieth year, and that the disease cannot be considered common before the fortieth year. Experience and observation has shown that gout and rheumatoid arthritis are not common before the thirtieth year, but that in one form or another they are quite common after the fortieth year. Analysis has shown that the blood of gouty and rheumatic subjects contains a larger percentage of uric acid than is normal, and that in certain conditions of the system this acid, in combination with calcium and sodium, is precipitated and retained in the connective tissue of articulating surfaces, producing all the conditions of inflammation except one,—viz., suppuration. Analysis has shown that the deposit found upon the roots of teeth contain uric acid in combination with calcium and sodium, and that such teeth are frequently found in the mouths of those known to have a gouty tendency, or a pronounced gouty diathesis. But you tell me that these coincidences do not establish truths; that uric acid may exist in larger proportions than is normal in the blood of many persons, and yet there may be no manifestations of gout or rheumatism. Candor compels me to admit the force of the objection, at the same time I can see no reason to suppose that fibrous tissue, wherever located, may not under similar conditions be equally susceptible to the deposition of uric acid. Dr. Alexander Haig, in his work on uric acid in causation of disease, claims that he is able, by certain articles of food, certain beverages and medication, to drive uric acid from the blood to the joints and back again from the joints to the blood; that it is

simply a matter of acidity or alkalinity of the blood. Dr. Garrod has shown that the cartilages and fibrous tissues of joints are less vascular and less alkaline than the other tissues or the blood, and since that be so, the arthritis produced by uric acid is a simple matter of solubility, and can be produced at pleasure to almost any extent. But it is not my purpose to enter into this phase of the subject. The object of this paper is to describe a few peculiar cases which have come under my observation during the past fifteen or more years; cases which at the time puzzled me not a little, and even now would bear a little illumination. These cases may not be exceptional, and possibly all of you have seen similar ones. I shall describe them as concisely as possible and trust that you may grasp the salient points of each. Mrs. A., perhaps forty years of age, called, suffering much discomfort from a first superior molar. The tooth was sound with the exception of a minute filling in the masticating surface; all other teeth present in the mouth and no indication of disease elsewhere. The first thing to attract my attention was a tumefaction at or near the apex of the buccal roots. It was quite large and presented much the appearance of an apical abscess just ready for the lance, except that its color was dark red, almost purple in hue. The tooth was somewhat elongated and sore to percussion or pressure. Without a moment's hesitation I decided that the tooth was a devitalized one and, with a spear-pointed drill in the engine, proceeded to make an opening into the pulp-chamber, the gold filling being my starting point. As I approached the pulp my patient gave indication of increasing pain, but supposing that to be caused by my pressure upon an inflamed pericementum, I lessened the pressure and revolved my drill with greater rapidity. You can imagine my surprise and chagrin when I found that I had plunged my instrument into a vital pulp. I said to myself, an anomalous case, indeed, an abscess upon a vital tooth. I then began to look for a cause, but to my surprise there was no break at the gingivæ. No salivary or serumal deposits to be seen, and no pus in what I had taken to be a sac. Baffled and confounded, I applied the ordinary remedies for pericementitis, devitalized the pulp and extirpated it, filled the canals, pronounced myself a careless dentist, and awaited results. Subsequent attacks of a similar character, extending over a period of perhaps five years, rendered the tooth a source of annoyance and discomfort. My patient finally concluded that an empty house was preferable to a bad tenant and it was removed,—the first break in an arch which contained sixteen beautiful teeth. Near the apex of the

buccal roots of the tooth in question a deposit of considerable serumal calculus was found, and in my opinion this was the cause of the first attack of pericementitis. I cannot say of my own knowledge that this lady ever had an attack of gout, but I do remember that prior to her death her hands were much disfigured by nodosities in the joints of the fingers. If this lady was a victim of uricacidemia, it may have taken the form of rheumatic arthritis instead of gout, as generally understood. Garrod says, "It is by no means rare to hear of inflammation of a joint by one practitioner called gout, by another rheumatism, and by a third rheumatic gout." The following case is more satisfactory because the patient is living and I have been able to follow it until the present time.

Miss B., aged about forty-five, called with the second inferior molar somewhat elongated and exceedingly sore to the touch. I observed the same tumefied condition upon the gum near the apex of the root, the same angry red appearance of the mucous membrane. The tooth was a sound one, never having been carious. Remembering my former case I did not attempt to open the tooth, but gave it such treatment as is general in pericementitis. I naturally looked for some exciting cause in the form of calculus, but failed to find any, either upon the tooth in question or other teeth in the mouth. I am positive that there was no pocket at the gingivæ. This attack lasted for several days and gradually subsided, but was followed a year or more later by another, at which time a pocket was apparent and pus exuding from about the neck of the tooth. The tooth was finally lost and serumal deposits found near the apex. Two other molars and a bicuspid in this mouth have had like histories during a period of ten years. Another molar is apparently to be lost in the same manner, for during the past few months I have seen the case to give it such treatment as I could to relieve existing pain. I may say just here that but one tooth in the mouth has been affected at the same time, and there is no appearance of pyorrhœa alveolaris in any part of the mouth.

I have recently learned the following facts, which it seems to me have an interesting bearing upon this case: The father, whom I knew well, had been a lifetime sufferer from gout,—the real old-fashioned kind,—which began with painful manifestations in the big toe and did not often get above the ankle-joints. I remember that years ago he told me that he used Blair's gout pills, made in England, and that he obtained greater relief from these than anything he had ever tried. He had been a patient of mine for twenty years,

and has lost many of his teeth from pyorrhœa alveolaris. The daughter, whose case I am describing, has never been in robust health, and has frequently had painful attacks of gout of the stomach. It seems to me that to an unprejudiced mind the proof of an inherited gouty diathesis is almost positive, and, if uric acid has any part in the production of calcic pericementitis, here is a case to warrant the supposition that it was the exciting cause in the attacks narrated.

The case which I am about to describe next would seem to furnish more positive evidences of the dual existence of uræmia, in the form of gout and inflammation of the alveolo-cemental membrane, than either of those previously mentioned. It is that of a bachelor, of about fifty years of age, who called upon me about three years ago, with much the same conditions which I have described in the preceding cases. At that time a bicuspid of the superior jaw was the seat of pain. The gum presented the same swollen and angry red appearance. He complained of great sensitiveness to heat and cold and to pressure. As the tooth was without fillings or cavities of decay, I did not open it, but gave the ordinary local treatment common in cases of incipient pyorrhœa alveolaris (?). It was some days before relief was obtained. At that time there were no other teeth similarly affected. As I remember the case, there was no discharge of pus following the attack. A year or possibly eighteen months subsequently the gentleman called, suffering pain in the same tooth. This was followed by suppuration, and of course a pocket at the gingivæ. Since then two or more teeth have had like histories. Anxious to know whether this individual had the uric acid vice, I inquired of an intimate friend of his and learned the following particulars. He has been a "high liver" for many years; indulged freely in wine, and especially champagnes; is a great sufferer from gout and dyspepsia.

I have reserved until the last a case which impresses me as being of peculiar significance. A gentleman, between sixty and sixty-five years of age, has called upon me several times during the past six months, complaining of great discomfort in a superior molar. It has been somewhat elongated and painful in mastication. There have been no marked indications of gingival irritation, no deposits of calculus, but redness and tumefaction along the buccal aspect of the gum. It had failed to respond to ordinary treatment, and, as other teeth had been lost from similar attacks, the gentleman insisted upon having this one removed. I found deposits of serumal calculus on both buccal roots. In reply to my

inquiry as to the presence of gout or rheumatism in the system, he pointed to his feet, which were encased in shoes made of soft kid, and greatly out of proportion to the man's stature. He then said, "I have been a great sufferer from gout for many years. I inherited it from my ancestors. I have thrice been to German spas for relief, and spent the whole of last summer in Carlsbad, hoping to find a cure, and am, indeed, better than in the spring." In reply to my inquiry as to whether he had taken salicylate of soda, he said that he had taken pounds of it, until it had so upset his digestion that he was obliged to discontinue its use. He had also taken lithia in various forms, but with indifferent results. Colchicum afforded the surest relief in exacerbations of the disease, but this was open to the same objection as the salicylate of soda.

I could mention other cases which have had similar histories, but no additional light need be shed upon the subject under consideration. I trust I have not wearied you with these details. Your experience and observation may not have been unlike my own. I have never been satisfied with the theory that all cases of pyorrhœa alveolaris were of local origin, and, while I cannot furnish proof positive that uric acid plays an important part in the formation of the calcic deposits to be found high up on the roots of teeth, I can see no objection to such a theory,—and why, I ask, may it not be so? Why may not the connective tissue forming the alveolo-cemental membrane be the seat of uric acid formations just as often as the joint of the big toe, the ankle, the knee, or the phalanges? The physiology and pathology of such a process is as simple as the pinpoint nodules which are left upon the mitral valves of the heart in rheumatism or the concretions of the kidneys. "Inasmuch as all portions of the body have been shown by pathologists to be liable to uric acid deposits, it is not at all strange that the alveolo-cemental membrane, composed largely of connective tissue, should also become a depot for uric acid deposits. It is more than probable that as a predisposing cause there might coexist some impairment in the nutrition of this membrane dependent upon either local mechanical force or some obscure faulty innervation. However this may be, the mere presence of these salts leads to the conclusion that here as elsewhere they are derived from the blood by or through the medium of the lymph-stream. With the absorption of the excess of lymph, the residual salts become precipitated upon the cemental surface." (Dr. Peirce, *INTERNATIONAL DENTAL JOURNAL*, January, 1894.)

There has been one peculiar manifestation in the cases which have come under my observation, which at first I found it difficult to explain, and that is the absence of suppuration in the first or even the second attacks of pericementitis. There have been heat, redness, swelling, pain, but not always pus. But as I have thought more upon the subject, I have concluded that the formation had not yet reached sufficient quantity to produce tissue-disorganization, and that, like other forms of pericementitis, yielded to bloodletting and counter-irritation.

Since beginning the preparation of this paper, my attention has been directed to an essay which was read by Dr. W. J. Reese, of Galveston, Texas, before the Louisiana State Dental Society, March, 1886, entitled "Uræmia and its Effects upon the Teeth." He begins his paper by the statement that as early as 1880 he became convinced that uric acid was the cause of "grave troubles in the mouth," and gives his reasons for believing that it is one cause of what he terms "phagedæna pericementi." Among other things, he says, "The term pyorrhœa alveolaris is a misnomer. One peculiarity of uric acid is that, while it will produce violent inflammation and intense pain, it rarely causes suppuration, except when in contact with the fluids of the mouth, and not always under these circumstances. Where the saliva does not come in contact, and where it is protected from the air, we have no suppuration on the roots of the teeth." In this particular, Dr. Reese's observation has been similar to my own.

In closing this imperfect paper, I would beg you to bear in mind that it is not intended as a scientific contribution to the etiology of a disease, but rather a description of a few cases which it seems to me cannot be accounted for except upon the theory of a constitutional vice.

NOTES ON HYDROGEN DIOXIDE (H_2O_2).

BY GEORGE S. ALLAN, D.D.S., NEW YORK CITY.

HAVING of late made something of a study of hydrogen dioxide clinically, experimentally, and by means of expert testimony, and found that, much as has been written and said about it, there is still, in a measure, lacking in our profession a working knowledge of some of its properties and qualities. It seems proper

to publish some notes taken, to correct errors as well as to invite discussion. Much care has been taken in obtaining information, and nothing has been accepted without careful examination.

There is no doubt whatever of the value of the agent or of the prominent place it will occupy in the dentists' "*Materia Medica*" in the future; therefore the more accurate our knowledge concerning it, the better it will be in all ways. There is a good excuse for many of the errors made by some of us, in the fact that the current literature of the day contains many misstatements of facts and theories, hence, of these we will take notice, prefacing our notes with a brief statement of what hydrogen dioxide really is and why it is so valuable.

Hydrogen dioxide, in its pure state, is a thick, syrupy fluid, but in that condition is a chemical curiosity only, as dangerous to handle as it is difficult to obtain. Dentists and physicians know it only in its solutions. It is known to chemists as an unstable compound, one ready to break apart. In its decomposition a molecule of it forms a molecule of water and an atom of oxygen. Water, as we all well know, is a stable compound, while oxygen, especially at the moment when it is freed from some former combination, is especially eager to enter into a new union. Its affinities are many and strong, and for few substances has it greater attraction than for some of the elements entering into the composition of disease-germs and decomposing animal or vegetable matter. These it at once attacks, breaking them up, uniting with some of their elements and forming new and harmless substances. Hydrogen dioxide is valuable only as it furnishes pure, fresh oxygen. The solvent ordinarily employed is water. To how great an extent water can hold hydrogen dioxide I do not know. The United States Pharmacopœia does not recommend aqueous solutions of a higher strength than three per cent.; the Pharmacopœia committee probably having found that aqueous solutions of a higher strength do not possess good keeping properties. Ethereal solutions, however, can be kept up to a strength of fifty per cent. A solution of this strength would, by the Pharmacopœia test, yield about one hundred and fifty times its volume of available oxygen. As to the strength of what might be called a saturated solution, and there is much difference of opinion as to the proper manner of estimating it, pure hydrogen dioxide will liberate some three hundred times its volume of oxygen when decomposed, not counting that held in the residue of water remaining. The United States Pharmacopœia standard preparation is a three-per-cent. solution,

equivalent to a volumetric strength of ten volumes of available oxygen per one volume of solution; each one per cent. counting 3.33 of volume. It is an easy matter to test the strength of any aqueous solution by the method given in the last edition of the United States Pharmacopœia. The decinormal solution of permanganate of potassium there recommended can be obtained from Eimer & Amend, New York City, and must be used when freshly prepared. The three preparations, pyrozone, the hydrogen dioxide of the Oakland Chemical Company, and hydrozone, were thus tested by the Pharmacopœia process, and all of them were found to be of full strength. The first two corresponding to a ten-volume test and a point or two more. Marchand's hydrozone did not come up to their published statement as to strength, but the test was hardly a fair one, as the portion tested was what was left in a bottle that had been open for some time; as it was, the test indicated fully a twenty-two-volume solution. It should have indicated about a twenty-seven-volume solution. Hydrozone is about the strongest aqueous solution in the market, but not the most permanent.

So much has been written concerning the value of the various aqueous solutions that it does not seem wise to cover the ground again. As a means of discovering the presence of pus and of destroying it utterly when found, it does not seem to have an equal. The action of H_2O_2 solutions in the presence of pus and decomposing organic matter is about as follows:

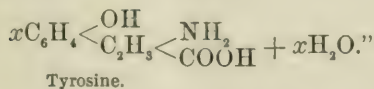
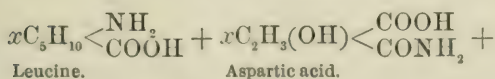
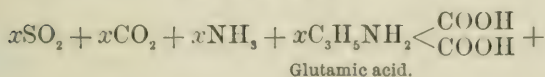
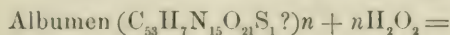
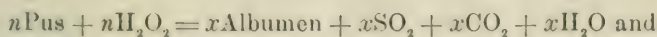
"Pus is an extremely complex body, and but little is known as to its constitution. Schwilgue has made an approximate analysis of its constituents, and finds it to contain albumen and water, a peculiar extractive substance, and small amounts of soda, phosphate of calcium, and other salts. It is easily coagulable by heat, acids, alcohol, and other liquids.

"In adding a little pyrozone three-per-cent. solution to pus, vigorous effervescence takes place, a mass of white foam resulting, which is easily disintegrated by water; carbon dioxide and sulphur dioxide, or sulphurous acid, are at the same time liberated.

"The exact chemical reactions taking place are not easy to determine, but probably something as follows occurs: The albumen is instantly attacked by the nascent oxygen liberated from the hydrogen peroxide, on contact with the organic substance, and an action probably occurs similar to that taking place when albumen is treated with oxidizing agents or alkalis. Albumen contains CNHOS in indefinite proportions. Part of the carbon combines

with the oxygen to form CO_2 , and the sulphur likewise unites to form SO_2 , the evolution of these gases causing the effervescence previously mentioned. The remainder of the carbon, nitrogen, hydrogen, etc., in the albumen, is converted into simpler bodies which are harmless and soluble. These would be principally bodies such as glutamic acid, leucine, tyrosine, aspartic acid, and ammonia. Were the action continued long enough, the ultimate products would be simply SO_2 , CO_2 , N.H_3 , and H_2O ; but it is unnecessary to proceed so far, the bodies formed being easily removed from a cavity by water.

"Expressed in the form of an equation, the reaction might be written,—



The evolution of gas that takes place in the above description of the chemical action is a most valuable help to the complete chemical disintegration of effete organic matter. By its means the said matter is broken up, its parts separated, and so more quickly and completely brought under the influence of the newly-born oxygen. As a mouth-wash, this means that the germicidal power of H_2O_2 is very great and that it will reach the interiors of masses of dead organic matter when other germicidal preparations, acting on the surface only and oftentimes actually forming on them a protecting coating, would fail to act, or at best act only imperfectly.

To the dentist the ethereal preparations of H_2O_2 , as pyrozone five-per-cent. solution and pyrozone twenty-five-per-cent. solution, are most useful. Ether, as a solvent, possesses valuable properties. The solution is a stable one, and bottles containing it can be kept and handled as freely as if they contained ether only; either of the

two preparations, the five-per-cent. or the twenty-five-per-cent. solution, can be evaporated seventy-five per cent. of their volume before the H_2O_2 is liberated. I have had numbers of bottles in more or less constant use during the last two months, and have had no trouble with them whatever. In no case, when drawing the stopper, have indications of undue pressure been observed.

The solvent properties of ether greatly aid in preparing the way for the action of the free oxygen. It readily dissolves the fatty matter contained in the carious portions of dentine; it penetrates the dental tubuli rapidly and effectually, carrying with it the H_2O_2 , which completes the process of germ-destruction and bleaching. The evolution of gas in the tubuli forces the contents out and leaves them in a clean, healthy condition. To obtain the best effects, it is wise to use the five-per-cent. solution first, and instead of evaporating it, swab it out, using it somewhat liberally; it may be absorbed with bibulous paper, in this way much of the bulk of the dead matter may be removed before the final bleaching or germ-destruction is completed by the pyrozone twenty-five-per-cent. solution. The action of this last should be hastened and increased by means of the hot-air blast.

The ethereal preparations will tell many a story of defective adaptation of filling-material to the walls of cavities. Many times, when patching old fillings, the eye fails to detect trouble until the forming of the gas around the defective margins points it out; especially has this been found to be the case in old amalgam fillings. It is both safe and wise to make this test in all doubtful cases.

One of the commonest mistakes made in referring to the action of H_2O_2 is found in the constant reference to ozone as being either formed or liberated by H_2O_2 in the presence of decomposing organic matter. It is safe to say that this is never the case. Ozone is an allotropic condition of oxygen. Three volumes of oxygen form only two of ozone. The oxygen molecule is composed of two atoms of oxygen, the ozone molecule contains three. Oxygen is soluble in water, ozone is almost insoluble, and should it be found in water, it would be almost at once liberated from solution. The literature on this subject, especially that in the circular or other advertising forms, including many journal articles, contains many curious examples of this error. The terms "hydrozone" and "pyrozone" convey a false impression, and ought never to have been adopted, though they are but distinctive trade names. On the first page of the circular issued by Marchand will be found the

statement, in large type, "Ozone is the healing agent of this remedy," referring to hydrozone; and further on, "Ozone being set free from the decomposition of the hydrogen coming in contact with the infected surface."

In a monograph published by the Oakland Chemical Company will be found the sentence, "In this connection it has been found that the peroxide (dioxide) of hydrogen, which is the subject of this brochure, is the readiest and most readily available and reliable source of free ozone or active oxygen yet discovered." Such erroneous statements as the above are hardly excusable.

The name Hydrozone is entirely a misnomer, indicating that the preparation contains ozone dissolved in water. Pyrozone, on the other hand, the makers inform me, is derived from the Greek word for fire, and is so named from a property possessed by anhydrous H_2O_2 of igniting a silk chenille ball when placed in contact with the pure substance procured from ethereal solutions. This term is applied not to the aqueous or ethereal solutions, but to the pure H_2O_2 itself, from which they are made.

An article going the rounds of the medical press contains some strange statements and deserves notice. It is headed, "The real value of medicinal preparations of hydrogen dioxide." Bearing in mind that the last edition of the United States Pharmacopœia states that the aqueous hydrogenii dioxide shall yield about ten volumes of available oxygen, and recognizes that as the official standard so far as volumetric strength is concerned, Dr. Endemann's "my opinion" that "a standard solution of medicinal H_2O_2 must contain at least fifteen volumes of available oxygen" seems rather out of place. Would the doctor have the reader place his authority as to what is the proper strength in advance of the United States Pharmacopœia? Again, referring to a certain brand of H_2O_2 solution, the doctor says it contains salicylic acid. The manufacturers of that brand deny that any of this acid can be found in their preparations, and the iron and ether test,—the usual one,—carefully made, entirely disproves the assertion of Dr. Endemann. Even trade criticisms ought to be fairly reliable.

Dr. Endemann, in a later article in the *Times and Register* on the keeping properties of solutions of H_2O_2 , written apparently for the benefit of a particular maker's brand, shows conclusively that pyrozone three-per-cent. solution is the most stable brand of H_2O_2 on the market. The loss of available oxygen, according to his own table, in a sample after being kept three months, is less than two volumes per one hundred volumes, whilst the brand of the maker

in whose interest the article appears to have been written, showed a loss of ten volumes per one hundred volumes. The freedom of the pyrozone solution from excess of acid, poisonous barium salts, and other impurities, was shown to be greater than any other brand on the market. Further, brands possessing a greater strength than that ordered by the United States Pharmacopœia are shown not to possess good keeping qualities, the pharmacopœial strength of three per cent., combined with freedom from excess of acid, being the requisites necessary to insure a stable permanent solution.

Pyrozone twenty-five-per-cent. ethereal solution can be used instead of sodium peroxide, and for the same purposes. It has the advantage of being always ready for use. The preparation of sodium peroxide requiring much care and attention on the part of the dentist, in a measure limits its value and advantages. At this writing, however, it is not possible to say which compound is best for dental purposes; the probabilities are that each compound has its special virtues.

Reading the article on electrozone in the February issue of the *INTERNATIONAL DENTAL JOURNAL*, I was easily satisfied that it was both weak and inaccurate, and did not fairly state either what it was or its mode of action. I therefore obtained a letter from Dr. Cyrus Edson, and also an opinion from an expert chemist. As they fairly present the subject, they are here appended.

"DR. GEORGE S. ALLAN, No. 51 West Thirty-seventh Street, New York City:

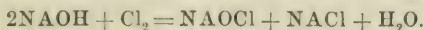
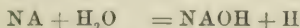
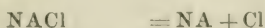
"DEAR DOCTOR,—In reference to electrozone: electrozone is a solution of hypochlorites, mainly, however, hypochlorite of sodium. It is produced by the action of electricity on sea-water. The current used is the Edison variety, low voltage, but high electromotive force, which is caused to act through electrodes of platinum and carbon. The result of this action is to decompose the salts contained in the sea-water, mainly sodium chloride, which is converted into sodium hypochlorite. This hypochlorite is a very unstable one, which is very readily decomposed by contact with organic matter. The result of the decomposition is the production at the point of contact of free oxygen and chlorine. These agents act on vegetable life instantly, destroying it. In a sense, electrozone is similar to Labarraque's solution, except that it, of course, contains no caustic soda. It is not poisonous in the ordinary sense of the term, and I believe is one of the most effective of disinfectants. Of course, a solution of hypochlorite produced in the way I have described may vary very considerably in strength, according to the percentage of chloride of sodium contained in the electrolyte, and the length of time and strength of the current applied. A solution of full strength should contain but a very small proportion of free chloride of sodium. Sea water containing four per cent. of chloride of sodium should have been so acted on by the current as to convert nearly all of the

chloride of sodium into hypochlorite. Such a solution would be, in my opinion, a better disinfectant than a five-per-cent. carbolic acid solution. The great advantage, however, of the hypochlorite solution made by the action of electricity is its extreme cheapness, in which point no other disinfectant that I know of is comparable with it. Yours faithfully,

“CYRUS EDSON.”

EXPERT OPINION OF ELECTROZONE.

In electrolyzing pure water slightly acidulated, minute amounts of ozone and possibly also H_2O_2 are formed. The ozone, being insoluble in water, is at once liberated, and cannot exist as such in any aqueous solution. These bodies are not, however, formed when solutions of metallic salts, particularly halogen salts, undergo electrolysis, local action, and secondary decomposition, apart from the action of the liberated ions sufficing to decompose them if formed. The electrolytic action taking place when a solution of NaCl is decomposed may be thus expressed,—



The ultimate products being hypochlorite of sodium with a little chloride and usually small amounts of free chlorine. Hydrogen is liberated at the negative pole. Carbon electrodes must be used to prevent the chlorine set free from attacking them. This in itself would prevent any formation of hydrogen peroxide.

ACTION OF ELECTROZONE DISINFECTANT.

Mr. Woolf's explanation (page 69) is ingenious, the only objection to it being the fact that it is altogether contrary to all chemical principles. The action of hypochlorites as disinfecting agents is not due to decomposition by organic matter, but to liberation of chlorine by acids, usually CO_2 . In this way hypochlorous acid is set free, which is at once oxidized by the oxygen of the air to form chloric acid, chlorine being set free at the same time. Thus, $4\text{HClO} + 3\text{O} = 2\text{HClO}_3 + \text{Cl}_2 + \text{H}_2\text{O}$. Neither free chlorine nor hypochlorites will abstract hydrogen from water, as stated, nor will Cl necessarily liberate oxygen from organic matter. The “three atoms of nascent oxygen” exist, therefore, solely in the author's fertile imagination. Supposing they were formed, we are not aware that ozone consisted of “three atoms of nascent oxygen.” Indeed, ozone is the exact opposite of nascent oxygen in composi-

tion, being a condensed form of that element, while nascent oxygen is oxygen in its simplest or atomic form.

ACTION ON GERMS.

"All germs subjected to the action of the electrical disinfectant are contracted, on account of the hydrogen being deprived of one element." This may be so, but we are not aware of it. Neither are we aware that hydrogen is a compound body and can be "deprived of one element." What element? The contraction of the germ, on the application of a saline solution, is easily understood by any one having the faintest knowledge of physiological botany. The plasmolytic action of certain salts on the vegetable cell is one of the easiest experiments to make, and one of the easiest to explain.

We do not see that the alteration in the shape of a dead germ adds anything to the value of a disinfectant, and whether the germ be round or long, so long as it is dead, it can do no harm.

Mr. Woolf advances a new test for the presence of bacteria, and a new proof that toothache is caused by bacteria. This, he says, can be proved because electrozone will cure it!

ACTION ON VEGETABLE COLORS.

According to the inventor, these are absolutely destroyed. Any tyro can prove the fallacy of this statement. The fact that any oxidizing agent will decolorize any such solution is well known, as also the fact that the color can be restored by the action of reducing agents. The organic matter is still there, it has been only slightly altered. Similarly other organic matter is merely oxidized to some other form, usually harmless, by disinfectants. To say that it is entirely destroyed is inaccurate.

"The scientists to-day claim that all germs have their origin in decayed vegetation." This is a revival of the long-since exploded theory of biogenesis.

The chemistry of the whole paper is lamentably weak, and the statements loose and inaccurate, even where the author's meaning is clear. For instance, "coal-oil is not obtained from carbon, neither are aniline dyes obtained from coal-oil," but from coal-tar.

COAGULATION OF GERMS (page 71).

These so-called disinfectants (HgCl_2 , $\text{C}_6\text{H}_5\text{OH}$, and SO_2), says the author, form a coagulated coating of albumen on the outside of the

germs, which are rendered temporarily inert. On the disintegration of the coagulated coating the *germ comes to life again!* It is idle work trying to prove that HgCl_2 and SO_2 are not disinfectants, when it is well known that HgCl_2 is more powerful than even free chlorine.

HEAT ON ELECTROZONE.

The author shows his great deficiency of knowledge of chemistry when, in reply to a question, he says that he does not know what the effect of heat on the solution would be. This is one of the first things a student of chemistry would learn, that on heating a solution of a hypochlorite, decomposition takes place with formation of a chlorate and chloride, thus rendering the disinfectant useless. H_2O_2 in solution has the advantage here inasmuch as it can be heated without risk of decomposition.

BLEACHING TEETH BY ELECTRICITY.

BY DR. ALBERT WESTLAKE, BROOKLYN, N. Y.

THE cataphoric effect of using pyrozone twenty-five-per-cent. solution in restoring the normal color of teeth in a few minutes is described in the following cases. The same appreciation of current, strength, and resistance must be considered as is used in cataphoresis on live dentine for cocainizing.

The result of continued experiments with ethereal solutions of pyrozone by cataphoresis in bleaching, abscesses, etc., will be embodied in a paper now being prepared on "Electricity in Dental Practice," which will be a supplement to the one read by me at Albany, in May, 1892.

CASE NO. 1.—Mrs. A. Nervo-bilious temperament; presented right inferior incisor very darkly discolored, a proximal cavity, and incipient abscess. After carefully adjusting rubber involving teeth on both sides, I cleaned the cavity, opened canal, and removed the pulp; I then passed a few shreds of cotton saturated with warm salt water in its place, after which I filled the cavity with pure absorbent cotton saturated with pyrozone twenty-five-per-cent. solution ethereal, and applied the positive pole galvanic current, in the shape of a needle, to the moist cotton, and placed the negative pole in the patient's right hand, repeating this three times as the cotton dried.

I commenced with four cells, and increased to about twelve

cells, when the tooth began to appear white in patches about the neck and half-way up the crown; this half of the tooth soon presented a bleached condition in sharp contrast to the biting-edge. I then transferred the negative pole and made a short circuit through the upper part of the tooth, after having cut a narrow ridge through the enamel of the biting-edge. I then filled the root-canal and cavity, and the biting-edge with gold. The tooth in other respects still retains a perfectly normal appearance.

This first experiment in cataphoresis for bleaching took place on Friday, March 8. The bleaching did not occupy more than ten minutes. The additional cataphoric effect on the periosteum and adjacent tissue was beneficial, as the tooth is perfectly comfortable at the present writing, three days after the operation.

CASE No. 2.—Miss T. Nervo-sanguine temperament; left superior central incisor had been treated and an attempt made at bleaching the tooth by a dentist in New Jersey. I removed the gold filling, and found that the tooth presented a dark straw-color. I applied the same method of application, but omitted cutting the biting-edge. I found the cavity in this tooth much larger, but as the canal was filled with cement, the resistance was greater, and more current was necessary. I continued the application too long, and secured too great a bleaching effect. I filled the tooth temporarily with gutta-percha, but will blend the extremely-bleached appearance by inserting a lining of cement.

CASE No. 3.—Gentleman. Presenting superior lateral. The method and result were the same as in Case No. 1.

SOME PRINCIPLES RELATING TO AMALGAMS.¹

BY EDWARD C. KIRK, D.D.S., PHILADELPHIA.

THE knowledge which we possess relating to dental amalgams has been achieved almost wholly as a result of the empirical method of study. The observation that filings from a silver coin, when made into a plastic mass with mercury, possessed the power of setting or hardening into a compact solid body probably first suggested the use of amalgam as a filling-material. The defects, which by experience in its use were disclosed in this amalgam, led to a further study of the subject, the object of investigation being the elimination of the defective features of the amalgam, with the hope

¹ Read before the New York Odontological Society.

of securing one that should possess certain desirable physical and chemical properties, thus raising its standard of excellence to a position more nearly approaching that evanescent vision, the ideal filling-material. In the course of time, and through the collective investigations of certainly a majority of dental practitioners, each member of the whole list of available metals, in varying proportions and relationships, has been impressed into the dental amalgam service, and made to show cause why it should not furnish the key to unlock the dental Utopia. But though each combination has been weighed in the balance of practical experience and found wanting in some essential feature, when measured by the ideal standard, still the average character of amalgam alloys has exhibited a most marked improvement, and there are now to be found and are everywhere obtainable alloys that fulfil their function as savers of teeth under certain conditions, in a manner unapproached by any other material.

As has been previously stated, this improvement of amalgams has been largely the outgrowth of the empirical, I might say "rule of thumb," method of study. No disparagement of that method is intended, nor should any reflection be cast upon it when its function is fairly recognized, for it is an essential part of the scientific method, and the basis of scientific advancement. It represents the fact-gathering stage of knowledge, and furnishes the plasma from which scientific generalization and reasoning has its growth and draws its sustenance. The element of weakness in the empirical method of study is that, unless pursued by those whose powers of observation are trained to accurate work, the resulting statement of the phenomena observed is likely to include irrelevant factors which detract from its value. This feature, unfortunately, characterizes much of the reported results of study of amalgams and their value as filling-materials. I hope to furnish concrete illustration of this point later.

A general review of the nature of the work which has been done with reference to amalgams will, I think, disclose the fact that investigation has addressed itself principally to the ingredients of the amalgam alloy, and the modifications which these ingredients, in kind, number, and amount, exert upon the physical and chemical properties of the resulting amalgam. Regarding them simply as mixtures of metals, it will be readily seen that practically an infinite number of amalgam alloys, each differing from all the others in some respect or degree, may be made with but three or four constituent elements. And further, that by the addition of

mercury in variable amounts to a given alloy, still another series of amalgams, each differing from all others of the series in physical and chemical properties, may be produced. We may then, for our present purposes classify amalgams into, first, a series in which the properties of the resulting amalgam are modified by alterations in the kind, number, or amount of the ingredient elements of the alloy, and, secondly, a series in which the amalgam is modified by changes in the proportionate amount of mercury with which the alloy is combined. The classification here proposed is simply a convenience for the study of the subject. As a matter of fact, no philosophical conception of the structure, properties, and composition of alloys should admit of a separate classification for alloys without and those with mercury as a constituent. Mercury being in all respects a metallic element, its fluid state is simply a matter of relative temperature. The alloys which are products of the union of mercury with other metals are termed amalgams, simply because of the increased softness and fusibility which mercury confers upon its alloys, but these are nevertheless alloys in exactly the same sense that we apply that term to combinations of other metals into which mercury does not enter as a constituent. We may still further classify amalgams into those which are combinations of mercury with but one other metallic element, for which class I have proposed the term binary amalgams, and, secondly, those which consist of more than one metallic element in combination with mercury, which class may be termed ternary amalgams. While quite a number of binary amalgams are known, but two have had any extended use as filling-materials,—viz., copper amalgam and palladium amalgam. Silver amalgam might possibly be included in this class, but there is no record to my knowledge of the extended use of an amalgam of pure silver and mercury. The old coin-silver amalgam once used, owed its value to the small percentage of copper which it contained, and this would include it among the ternary amalgams.

In 1863, Matthiessen suggested it as probable that "an alloy is either (1) a solution of one metal in another; (2) a chemical combination, (3) a mechanical mixture, or (4) a solution or mixture of two or all of the foregoing." Investigation has served to strengthen the correctness of this view of the constitution of alloys, and dental amalgams afford some striking confirmations of it. In all amalgams which possess the quality of setting or hardening from a plastic mass, we have to deal almost certainly with a chemical combination. The property of setting is itself an evidence of chemical

combination, and the formation of many amalgams is attended with elevation of temperature, more or less marked, which is another indication of chemical combination. Changes of the volume of the mass attendant upon the act of setting still further indicate that chemical union of some portion of the constituent elements of the amalgam has taken place.

There can be no doubt that the best results attainable in the formation of a dental amalgam will be those based upon the production of one in which all the constituents are chemically united in atomic ratios. Under these circumstances only have we the right to expect to produce an amalgam in which all the affinities of its constituents are satisfied, and which for that reason will not be liable to physical or chemical change. An amalgam in which all the constituent elements are not chemically united is necessarily in a condition of stress, and more subject to the influence of the chemical affinities of its environment, which perhaps slowly, but not the less surely, develop evidences of instability in the fillings made from it. While this principle has been recognized as an important and desirable one in the production of an amalgam, and though attempts have been made to practically utilize it in the preparation of amalgam fillings, the methods proposed do not seem to have achieved the object aimed at,—viz., to secure an amalgam filling in which the chemical affinities of the constituent elements are mutually satisfied. As an aid to a clearer comprehension of what it is desired to achieve in this direction, let us examine for a moment the binary combination of copper and mercury, which we know as copper amalgam. Both copper and mercury being bivalent elements, their chemical combination would naturally be made up of one atom each, and the formula of the compound would therefore be CuHg . As a matter of fact this atomic combination of mercury and copper has been found to exist. It may be made by bringing the two elements together with mercury in excess, allowing the compound to crystallize, and then squeezing out by a pressure of about sixty tons per square inch the excess of mercury. There are two other chemical compounds of mercury and copper theoretically possible, but they need not be considered here. It is only necessary to bear in mind that copper and mercury do unite chemically with each other in definite atomic proportions, that the compound is crystalline, and has the formula CuHg . It should be further noted that the atomic combination of mercury and copper, CuHg , is soluble in mercury, and that mercury may be added to it in considerable quantity without preventing its setting property

or power of recrystallizing after having been softened by heat. The copper amalgams which have been used as filling-materials are probably, without exception, solutions of the atomic combination CuHg in an excess of mercury. This statement is borne out by the fact that the dental copper amalgams on the market vary considerably as to the amounts of mercury which they contain, and differ also as to the degree of heat required for their fusion. A further evidence of this feature of their structure is their behavior when heated. The gradual application of heat to dental copper amalgam causes at first an exudation of numbers of minute globules of a more fusible amalgam containing a large excess of mercury, which is followed by a softening of the whole mass. Again, when the mass has been made plastic by heat and the kneading process, and after a few minutes have been allowed to elapse to allow crystallization to commence, the excess of mercury may be squeezed out through chamois with the pliers. These phenomena in the behavior of copper amalgam furnish striking evidence that the amalgam is essentially a true chemical compound in definite atomic proportions, and that within very narrow limits any excess of mercury is an element of weakness, not only because such excess is left in a free, uncombined state which renders it more easily acted upon by the oral fluids, but because the excess impairs the integrity of the filling itself, rendering it less capable of withstanding physical wear and tear.

Knowing the chemical valence and atomic weights of the metals concerned in the formation of amalgams, it becomes a simple matter of calculation to determine the percentage amounts required in each instance to effect a combination in atomic ratios. This is especially true of the binary amalgams, but when several metals are used as constituents of an amalgam, the problem becomes exceedingly complex. I am well aware that attempts have been frequently made to accomplish the synthesis of a complex metallic compound of this character, suitable for a filling-material. The effort has resulted in various devices for adding an accurately weighed or measured quantity of mercury to a definite amount of alloy filings, but I gravely question the accuracy of the result, so far as achieving a definite chemical compound is concerned.

I regard such a method of preparing an amalgam mass as inherently bad, both theoretically and practically. While the process alluded to is evidently based upon the expectation of securing an amalgam mass in which the constituents are united in atomic ratios, there is no evidence to show that the result is attained, and, on the

contrary, there are very good grounds for believing that it is not. Admitting that the components of the alloy are so related to each other and to the mercury in number and amount that, when brought together under ideally favorable conditions, a perfect atomic combination would result, we are met with practical difficulties not as yet overcome when we attempt to bring about the combination. The alloy, in the condition of shavings, filings, or coarse powder, is intimately mixed with the measured quantity of mercury, and, no matter how thoroughly the mass may be kneaded and worked, the selective affinity of the mercury will cause it to first seize upon that constituent of the alloy for which it has the strongest attraction, and thus satisfy itself before the mass is homogeneously amalgamated, or portions of the alloy will be amalgamated only superficially. The result of this will be a mass which, when set, will consist of a magma of amalgam, which is a true chemical compound, holding in its structure particles of unamalgamated alloy. Such a mass is not only lacking in homogeneity, but favors the development of local electrical action within its structure.

The desirable end of producing an amalgam in which an atomic combination of its components is secured may, I believe, be brought about in a much simpler and more practical manner by taking advantage of the selective affinity of the mercury and utilizing it for the purpose. A simple chemical illustration will perhaps make this point clearer. If to a considerable quantity of dilute hydrochloric acid we should add sodium carbonate solution in an amount not sufficient to neutralize the hydrochloric acid, we would have as the result a certain quantity of sodium chloride, formed by union of the two substances and dissolved in an excess of dilute hydrochloric acid. We could readily recover the sodium chloride from such a solution by removing the menstruum, which might be done by concentrating the liquid to the crystallizing point and separating the crystals from the mother liquor by filtration. In the process just noted, the sodium of the sodium carbonate added to the hydrochloric acid in excess has combined with only just so much of the chlorine of the hydrochloric acid as was necessary to completely satisfy their mutual affinities in the formation of sodium chloride, in accordance with the well-known chemical law that all combinations of elements take place in definite proportions by weight.

Now, we have seen that there is positive ground for the belief that amalgams, and especially those concerned in dental work, are essentially chemical compounds; it naturally follows that these combinations of mercury with the metals composing the amalgam

alloy must take place in atomic ratios, and therefore in definite proportions by weight. It matters not whether the alloy be in excess or whether the mercury be in excess, the definite mercurial chemical compound is formed and its properties are modified by the excess of whichever element or elements remains over and above the amount needed to form the definite compound. We have now to consider the two methods of manipulating amalgams which are commonly employed, and their relative values, in the light of the principle which I have just endeavored to elucidate. Our objective point being to secure a definite chemical combination in atomic proportions, let us see to what extent the end is realized in each of these methods. If to a globule of mercury filings or shavings of alloy are added until a mass of proper working quality is produced, there is absolutely no guide whatever upon which the operator may depend to indicate to him the point at which the proper amount of filings has been added to exactly satisfy the chemical affinity of the quantity of mercury which has been employed. He uses his taste and judgment in producing a mass of proper working qualities. Now, taste and judgment are such extremely variable factors that they are worse than valueless as standards of scientific exactitude. Moreover, an amalgam mass of "proper working qualities" is not by any means the object for which the amalgam is being made. First, and beyond all other considerations, it is intended to produce a filling-material which shall possess the most desirable features belonging to its class. Its working quality is, or should be, a minor consideration. The method of adding filings to the mercury is subject to another feature of inaccuracy,—viz., that the filings are liable to be added in excess, so that the resulting mass is lacking in homogeneity and is liable to local electrical disturbance. It is, of course, clear that should the alloy filings be present in excess there is no possibility, from the nature of the compound, of directly getting rid of the excess of filings.

The method of weighing or otherwise measuring the amounts of mercury and filings employed, so as to secure uniformly related proportions of the constituents of an amalgam, is of course an improvement on the method just noted, but is still so lacking in accuracy as to have nothing to recommend it in comparison with the more common method of mixing amalgams, and which we will now consider,—viz., adding mercury in excess to the comminuted alloy and then removing the excess. By adding mercury in excess we have, of course, supplied all the mercury to the elements of the alloy with which they can combine.

We have also seen that these combinations of mercury with the metals take place in definite atomic proportions. The first phenomenon which we perceive on bringing together the mercury and filings is that solution of the latter has taken place. If sufficient mercury has been employed, the mass will in a moment become of a soft, buttery, or paste-like consistency, which when rubbed between the fingers or in the palm of the hand will not show the slightest trace of solid particles, for the reason that complete solution of the solid alloy has occurred. After the lapse of another short interval crystallization slowly commences, the mass thickens slightly, and when pressed carefully between the fingers emits a peculiar, softly-grating sound very much like that which may be produced by compressing a package of powdered starch. This sound is caused by the grating or rubbing of the crystals against each other, and is the analogue of what the Germans call the "*zinn schrei*" produced by bending a bar of pure tin in the hands. At this stage of the process we have a mixture of a definite chemical compound or compounds between mercury and the elements of the alloy in atomic proportions and crystallized, which is dissolved in its menstruum, the excess of mercury.

As it is our purpose to utilize only the chemical compound of mercury and the alloy as a filling-material, the next step is to get rid of the excess of mercury. This up to a certain point is readily accomplished by straining out the crystals through chamois-skin by compression with heavy pliers. All of the excess of mercury, however, cannot be removed in this way and the mass left in suitable working condition. It has been proposed, and the plan is pursued by some, to use portions of the mass soft or plastic, and to add to this other portions from which more of the mercury has been removed by greater pressure. This method is open to the objection that it does not remove sufficient of the mercury,—*i.e.*, all that may safely be removed without endangering the integrity of the chemical compound of mercury and the alloy. The best method within my knowledge, and one which gives results superior to anything I have ever seen in the quality of the fillings produced by it, is to absorb the excess of mercury from the surface of the filling by means of crystal or sponge gold. The amalgam mass, after crystallization has fully commenced, should be squeezed in chamois until an easily workable mass is produced. The amalgam is then introduced into the cavity of decay and the filling built more than flush or full contour. Pellets of freshly annealed sponge gold are then rubbed into close contact with the amalgam surface by suit-

ably-shaped instruments. This process is continued as long as any whitening of the gold will take place by contact with the filling. When no more mercury can be extracted in this way, the filling may be carefully burnished, and in a very short time—depending more or less upon the kind of alloy used—may be given a final polish.

A number of analogous processes have been advocated and are in use by various members of the profession for removing or extracting the excess of mercury from fillings. Dr. Bonwill has, I think, advocated the use of bibulous paper in packing the amalgam to "absorb" the excess of mercury. Bibulous paper will, of course, not absorb mercury, but, used as recommended by Dr. Bonwill, it compresses the mass of amalgam crystals in the filling and causes the mercury to exude upon the surface, where it may be wiped away or absorbed by sponge gold. Gutta-percha, chamois-skin, leather, rubber dam, or a round soft-rubber point will produce precisely the same effect in compressing the mass of crystals and causing the mercury to exude from the surface. None of these expedients, however, remove it. Gold-foil in the thinner numbers, as advocated by Dr. Rhein and Dr. Ottolengui, will extract the excess of mercury from a filling almost completely, but the process is tedious and unsatisfactory in comparison with the use of annealed sponge gold. I should also consider the permanent attachment of the gold-foil as a part of the filling an objectionable feature of this method. Tin-foil and shredded tin have been used for the same purpose with fairly good results, but preference should be given to gold in this connection on account of its superior affinity for mercury.

Reference was made in the early part of this paper to the empirical method of observation and its proper status in comparison with the scientific method. The various procedures which have been cited relating to the extraction of the excess of mercury from amalgam fillings furnish the concrete example referred to of the inherent weakness of the empirical method as a sole means of arriving at the truth. It has been a matter of common observation that fillings of amalgam made with a minimum amount of mercury gave better results than those in which mercury was in excessive amount. Hence various devices in removing or getting rid of the excess of mercury have been brought out. Both the observation and the devices are largely of the empirical order, and each of the latter has its advocates. It would seem, however, with the mass of data at our command that we should have some better

reason for the use of a given method of this character than that it gives good results. We should be able to say why it gives good results, and to know, for example, whether it is best to mix an amalgam by this or that process, whether it is better to use bibulous paper, rubber dam, gutta-percha, chamois-skin, or sponge gold to get rid of the excess of mercury, and the reasons therefor.

I have presented for your consideration in a somewhat elementary way a subject upon which, I presume, every dentist has an opinion. It is this very multiplicity of opinions which, unless properly controlled and related by scientific method, will greatly inhibit the usefulness and proper application of the material under consideration. Our results, save a few notable exceptions, have been too much the product of guesswork and imperfect methods of investigation. We cannot secure the highest results in this, or, in fact, in any of our departments until we conduct our observations and investigations and formulate our results in harmony with the only logical method of reasoning, the scientific method.

Reports of Society Meetings.

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, January 15, 1895, at the New York Academy of Medicine, with the President, Dr. Northrop, in the chair.

The minutes of the previous meeting were read and approved.

INCIDENTS OF PRACTICE AND CASUAL COMMUNICATIONS.

Dr. J. A. Bishop.—The plaster cast which I have with me this evening shows the result of a wound caused by a Winchester rifle, the history of which I wish to bring to your notice, as it seems to me of such importance that you may be interested in it for a few minutes.

The patient was a fireman on a through train on the Northern Division of the Missouri, Kansas and Texas Railway, which was held up in December, 1892, by masked robbers. The engineer succeeded in running his train away from them, but the fireman was

struck by a rifle-ball, which carried away the lower portion of his face, the lip, alveolus, the teeth, fracturing and taking away part of the jaw, and leaving only one molar tooth on the left side. Here we have a condition of things not easy to overcome.

The patient was taken to a Missouri hospital for treatment, but as far as I could learn no dental surgeon was there.

Had the case received treatment by some one understanding the use of the double splint, the bone would have been supported until it could unite in its place. Then a plate could have been made and inserted, using the one remaining lower tooth as a support, and would thus have become a foundation for further surgical operations.

Instead of proceeding in that way, the method used in this case was to repair the face first, and the drawing together of the parts displaced the fractured bone, and the cicatricial tissue will, I think, prevent any treatment from restoring the bone to its usefulness.

In my paper before this Society, two years ago, it was my wish to have it understood that the great success in the Carleton Burge case was due to the preparatory treatment by the oral surgeon. This has been an age of improvements and advancement in all branches of science, and the method used in that case was entirely new. The voice was restored, together with the power of receiving and holding food so that the patient could masticate it and perform successfully the necessary deglutition. Then plastic surgery restored the face, and the man is living to-day.

The chief object of this paper is to bring into prominence the supreme importance of having the initial treatment of this kind of injury on the proper lines, so that when the patient is turned over to plastic surgery the conditions of the mouth are healthy and in no way interfere with its success.

The patient to whom we have referred to-night was sent to New York by his local branch of the Brotherhood of Locomotive Firemen, an organization embracing fifty thousand men, nearly every one of whom is constantly exposed to the risk of accident, and the accident is as likely to be about the jaw as elsewhere. Yet, with all these dangers existent, no hospital in this country, that I know of, makes any provision for such cases. In London and Glasgow we find some preparation made for the proper treatment of these injuries; why not in New York? We find, in the Twenty-sixth Annual Report of the Presbyterian Hospital, a list of "Special Consultants," composed of specialists in the different

departments of medicine and surgery, and yet no oral surgeon is mentioned. There are fifty-two hospitals of one kind and another in this city, but no one of them makes any provision for accidents to the mouth. I believe that this is chiefly due to the fact that physicians and surgeons have not recognized any dependence on our profession. But I hope that this recognition and co-operation are gradually growing for the good of mankind in general, and that one of their first fruits will be the provision for oral surgery in some of our hospitals.

Dr. Jarvis.—A little case occurred to me this afternoon, and on the way here to-night with Dr. Hill I related it to him. Possibly it may give a hint to some one situated as I was this afternoon. There was a young lady, about twenty years of age, at my office with a first superior bicuspid quite badly decayed. After applying the rubber dam and excavating the tooth, I found it very much worse than I had imagined when I commenced. When I had removed all the decay, there was nothing but the inner and outer walls left standing, and they were quite thin. The grinding surface was entirely gone. The young lady was averse to having a crown put on, and nothing but a plastic material could possibly be put in the tooth; and oxyphosphate, in a short time, would wear away and leave the tooth with a ragged and uncared-for appearance. I hardly knew what to do, until it occurred to me that I had a piece of porcelain in the office—several pieces, in fact—that I had for about ten years, and had never used. I took one of them and ground it to fit into the anterior approximal and grinding surfaces, filling up the space almost entirely with the porcelain. I cut a groove in the thickness of the porcelain for the oxyphosphate to work into and hold it, and then pressed it firmly into place. That left the contour of the tooth, as it appeared from the front, very respectable. It made quite a presentable-looking tooth after I got through, and it did not take very long to do it.

Dr. Meeker.—I want to ask some advice. I have a patient who has a very bad case of pyorrhœa, from canine to canine. I treated him some time ago, but did not see him for about two months. Three or four days ago he came in, and I looked at his mouth. The central incisor was gone, the lateral was loose, and the gums were all purple; but the peculiar thing was that the upper lip was swollen inordinately. Underneath it was a large mucous patch, probably an inch long. The man said he had not slept that night, and could not sleep without having ice-water to take every few minutes. It seems to me that pyorrhœa had nothing to

do with the lips to give them that appearance. I cannot make out what connection the tumefaction of the lips has with the pyorrhœa. If any one can enlighten me, I shall be very glad.

Dr. Hill.—How many of his teeth are gone?

Dr. Meeker.—One of the centrals.

Dr. Hill.—Are the other teeth very loose; all on the upper jaw?

Dr. Meeker.—The lateral is quite loose.

Dr. Hill.—If you will remember, about ten years ago I had a similar case, and brought the gentleman to this Society. The case was almost identical. The gentleman came to me, and I advised him to have four incisors out; then I told him I would bring him here, and finally I sent him to Dr. Atkinson for treatment. He went there, but got no better. He came back to me, and I extracted those four incisor teeth. Those teeth were as nice and clean as could be, and not a particle of foreign substance was or had ever been on them. I treated the case with sulphuric acid. The singular part of it is, that once a year he appears with some other tooth starting precisely in that way. He is very much frightened, and the moment he feels a little swelling he comes to me. The next tooth that was attacked was the first molar, with a swelling as large as a pea at the margin of the gum. I treated it with sulphuric acid, and cured it. The next tooth was an incisor in the lower jaw, and the bone between the two teeth was entirely gone in two or three days. I cured that too, but now in the lower jaw you can see a space just as if the tooth had been removed. He came to me recently with the second superior bicuspid on the left side discharging pus very freely. I treated him with sulphuric acid. Take an orange-wood stick, sharpen it nicely; then take your knife and roughen it the least bit, enough to hold a dozen fibres of cotton. Insert that up under the gum.

Aromatic sulphuric acid ordinarily is about one to eight. I would try that first, but do not be afraid to use it up to forty per cent. If you think the bone is affected, use the forty per cent. until you are sure you have dissolved all the diseased bone. If that man stays away from me three days after he feels this swelling, it will take me a month to get the best of it; but if he comes immediately, it does not. To show you how quick this last case was, he felt it on Saturday, and he waited until Monday, and as I say, there was a cavity there into which you could put your little finger.

Dr. Meeker.—I used sulphuric acid, and I have no objection to taking out all the teeth, for I am sure I cannot control the disease.

I want to control this swelling of the lips. A New York dentist treated the case about five or six years ago.

Dr. Hill.—Take out the teeth and use wine of opium plentifully. In this case none of the pulps were dead except one central. Before I extracted I drilled into the teeth to find out.

Dr. Walker.—Had the patient of Dr. Hill been under constitutional treatment?

Dr. Hill.—Yes; but not the kind of treatment I wanted him to have. He was a homœopath, and took mercury. I did not want him to do that, but he did. He has stopped it now.

Dr. Kirk, of Philadelphia, then read the paper of the evening, entitled "Some Principles relating to Amalgams."

(For Dr. Kirk's paper, see page 214.)

DISCUSSION.

Dr. Kirk.—I have demonstrated this to be a fact, and we have another striking illustration of it in the alloys of copper with lead. They are sold in commerce, and known as pot metals. They consist of copper with a large percentage of lead. The resulting alloy, when cold and broken, presents a spongy nidus of copper in which globules of lead appear. Such a combination is in the nature of a solid emulsion. When we produce an amalgam after the manner which has been noted here, we have a similar state of affairs; a mass of amalgam holding in its meshes either unamalgamated filings or portions which are not thoroughly saturated. It is more like a solid emulsion than anything to which I can compare it.

Dr. Sanger.—I would like to ask Dr. Kirk if he allows the pellets of gold to remain there after he removes the mercury.

Dr. Kirk.—I would remove the gold surface. The object is to get a chemical combination of mercury with the alloy in definite atomic proportions not to form a gold amalgam on the surface of the filling. The sponge gold is used merely to remove the excess of mercury.

Dr. Clowes.—I am always interested in the subject of amalgam, but really do not know much about the scientific methods propounded here to-night. I should be at a loss in preparing fillings in that way. I do the thing after the ancient fashion of triturating the mercury and alloy in the palm of my left hand. Neither mortar, nor pestle, nor buckskin, nor chamois, nor pliers enters into my manner of procedure. Considering that I must have mixed fabulous amounts in my open palm, who does not wonder at my survival? I feel thankful every day of my life that we have

been blessed with so many good alloys and that they possess so largely the quality of saving teeth. The old reliable Lawrence is almost a standard, and what I said for it many years ago I repeat now, that "with it I have achieved many of the best results of my professional life." It does not occur to me that any one has even thanked me for saying this, although my endorsement could not have been without effect. Under the old *régime* metallic copper was supposed to be a beneficent ingredient of amalgam, but in these later years chemically scientific copper has proved to be a scourge of tremendous proportions. Cadmium in amalgam is considered little better than a "pestilence in the land," and such I proclaimed it in the years gone by before this Society. If in the future scientific research shall bring out better things for amalgam than we now know I will gladly welcome them, but even now in its common-sense form it is the superlative marvel among marvels in our profession.

Dr. Kirk.—In writing the paper I endeavored to show that it was the chemical compound of the mercury with the elements of the alloy, which is the only relatively stable portion of the material. It would be impossible to say just what the composition of it is, for it is a compound produced by what we call selective affinity, produced under varying conditions and which would not have the same chemical composition under all circumstances. What we get rid of by squeezing through chamois is all that is over and above the amount of material necessary to produce such a chemical combination. It is a chemical combination that we are trying to arrive at. It is not a danger; it is a hope, and the effort is towards getting rid of that excess of mercury and other metals so we may utilize the remainder which is in chemical combination. That is the essential point of the paper; it is a plea for the rational adoption of a well-known method because it is superior to any other which has yet been offered. It is one that we use empirically, I know, but I tried to bring out the scientific reasons for its accuracy.

Dr. Bogue.—Have you ever analyzed the mercury that has oozed through chamois-skin to ascertain if it does carry other metals with it?

Dr. Kirk.—It does carry other metals with it. That can be tested by using that excess of mercury in mixing with other filings. An alloy mixed with the expressed mercury will not give a combination at all like the original mixture.

Dr. B. C. Nash.—There is a method of absorbing the surplus mercury which has not been mentioned. Several years ago I spoke

at the First District Society, giving a method that I believed I was the only one then to use. Dr. Dwinelle had described his method of using freshly-mixed amalgam and driving off some of the mercury by heat, placing that on top of his filling, and in that way getting a harder surface, at the same time absorbing the excess of mercury. I went further than that, and said that I was in the habit, and had been for some years, of using wafers of crystalized amalgam,—taking them on a flat instrument, holding it over an alcohol flame, using judgment in regard to the amount of heat, placing them on top of the freshly-made filling, burnishing into and upon it, and in that way absorbing the excess of mercury. I do not advocate that entire fillings should be made of old, crystalized amalgam, but I do claim that you can absorb the mercury in that way, and, as it is conceded that the other methods that have been described are empirical, that this is as good a way as using gold or any other material for the purpose if you get the result desired. I am satisfied with the method and use it constantly.

Dr. Bogue.—I came prepared to find fault with Dr. Kirk, but I cannot. The points that I was going to criticise he himself has taken up and criticised rather more than I would have done. Yet possibly there is a word or two to be said in addition to his able paper, which places us on a track upon which we are not put every day,—things that have been alluded to by the last speaker. If he wants odd ways of absorbing mercury he has only to squeeze copper amalgam and it will absorb quite a bit. I do not understand that to be the question. The essayist has wisely brought before us, not in so many words, the question how best we may adapt a certain filling-material to the conditions which are presented in our daily work. I do not want to take issue with him in one single particular, but I think I may add that I believe Dr. Palmer in the paper which he read here in the latter part of 1894 gave us one *practical* point (when empiricism becomes science I do not know), which was to place a couple of layers of thin tin-foil in the bottom of the cavity which is to be filled with amalgam. He gave us a pretty good reason for it. Perhaps I may diverge here or interpolate a word, and say that he gave us just as good reason for that process as he gave for our not using oxyphosphate of zinc on approximal cavities up under the gum, and lest the gentlemen present shall have forgotten why, I will give the reason: because above the gum line of upper teeth is an antacid condition,—below is perhaps an acid condition. Alkalies destroy the phosphate of zinc; acids do not. He suggested that tin should be put under our amalgam fillings, but in

1873 came the direction to use gold on the surface, to absorb surplus mercury, and I was somewhat ridiculed for the idea.

Dr. Kirk.—That tin under amalgam was for a therapeutic effect, was it not?

Dr. Bogue.—No, unless you mean that oxidation of the tin is therapeutic. I understood him to mean what you speak of to-night.

Dr. Kirk.—I would take exception to that. I believe the lining with tin was for its possible therapeutic effect.

Dr. Bogue.—His idea of the introduction of tin was that the tin might oxidize.

Dr. Kirk.—My point was the question of the homogeneity of the filling.

Dr. Bogue.—That use of gold is not very generally understood. It is not recognized everywhere that gold has a very strong affinity for mercury, and hence it is the best material to use on the surface. It is not recognized that the cohesion of gold with the amalgam filling is very light, and we could not leave much on the surface if we wanted to. It is not recognized that it is the mercury, in many instances, which causes the discoloration of amalgam to which we object so strenuously. *Dr. Kirk* did not bring that out.

Dr. Kirk.—I am not sure that it is, so I did not bring it out.

Dr. Bogue.—Many instances can be given where two fillings from the same mix are put in the same mouth at the same sitting; one is a good filling, the other a bad one; one a hard filling, the other a soft one; one an apparently hard filling under the microscope, the other a spongy granular one. What is the reason?

Dr. Kirk.—How do you know it is not the silver that is responsible for the discoloration?

Dr. Bogue.—We drive off the mercury from one filling by means of pressure and absorption with gold. You put in another amalgam filling by placing it in with no pressure, let it set, having no pressure whatever, and the filling will be black. The first filling will be hard and fine and white in color and accurately adapted to the walls. The other is pretty sure to be granular and not adapted to the wall, and will show a tendency to curl up at the edges.

Dr. Kirk.—While that is evidence, it is not necessarily proof that it is due to the mercury. It is due to the mercury plus what it has dissolved in it. What you have in the one filling is a chemical compound, which is the point I am driving at.

Dr. Bogue.—I hope you are right, but your contention is hardly proved as yet. It is a novel view of the matter, with a probability

that you may be right. Another quality that is constantly alluded to is edge-strength. Incidentally we may infer between the lines that there is edge-strength gained. The matter of edge-strength is one which I think we ought not to consider. That may seem strange, but I should like to recapitulate what I have said in this way: That in this material, which a long while ago Dr. Clowes wanted us to use and we would not, we have a material which, if properly used, may be of infinitely more service than has yet been supposed. We have a material which put in with matrices, malleted in to press the mercury to the surface, and then having the mercury taken off with gold, is admirable. You get a good thing to contour with, and you get a surface which is whiter than a discolored tooth (as a gentleman once said to me). If it is put in with heavy pressure, and the surface be stippled with gold, it will set before the patient leaves the chair, and will stay white if the materials are right. Dr. Kirk, I suppose, left off from his paper purposely, because he had not room enough, the various and diverging effects of gold, palladium, zinc, copper, and aluminum in various dental amalgams. There has been so much said on those subjects by those who have not experimented that I feel a little bit inclined to put a word or two in just here, in view of these constant remarks. It is not, perhaps, generally recognized that from two to five or possibly ten per cent. of gold may make a stronger and whiter amalgam, whereas if you carry it to twenty per cent. your amalgam deteriorates, is softer, and does not set as well. Two or three per cent. of palladium will cause an expansion and whitening of your mass. Carried to excess, glass tubes will break from the expansion. Zinc in small quantity produces a white amalgam, and we all know about copper. I was delighted, when this subject was brought up, at the hit it gives to platinum and aluminum. There are aluminum alloys put on the market when I do not believe it is possible to make an amalgam of aluminum in any way. As it does not amalgamate, it leaves a granular mass perceptible under the finger, and of course it is perceptible at the wall of the cavity.

Dr. S. G. Perry.—There is another question in relation to this subject that has not been touched upon, or else I did not hear it. I refer to the spheroidal tendency of amalgam. About ten or twelve years ago Dr. J. Smith Dodge read a paper before this Society, at the house of Dr. Kingsley, I think, on the subject of the spheroidal tendency of amalgam fillings. In that paper he took the ground that amalgam has that spheroidal tendency. I think he expressed what was in the minds of many, and what had been

spoken of before, and what had perhaps been accepted as correct ; but I do not think the subject had ever been put so clearly or so scientifically. That was the first satisfactory explanation I had for the advantage that I was sure arose from the use of crystal gold for absorbing the excess of mercury. I would not for a moment undertake to discuss this question from the chemical stand-point or from the stand-point of an expert like Dr. Kirk, for we must sit at his feet and learn wisdom as far as those things are concerned. We cannot give the time to those experiments, and we can only view the question from the clinical aspect. I use the amalgam in a moist form first, so I shall be sure to get a perfect adaptation to the walls of the tooth in every way ; also to insure a perfect "mixture." Then I get out the excess by using warm instruments and annealed crystal gold. I take out as much as I can, and then finally take off all that is possible from the surface with the crystal gold. I have never found anything else that will compare with it. I have used it for a great many years. I do not know who first used it. It did not originate with me, else I should have remembered my first use of it. As Dr. Bogue has intimated, crystal gold does not adhere, and cannot easily be made to do so, but it will take away the excess of mercury. Dr. Nash's idea I have tried, but I do not think it is as handy or as neat or as satisfactory, and I am willing to pay the extra cost of the gold in that form to be able to take away the excess of mercury in such a quick and satisfactory manner. It has a double effect. It takes away the excess and leaves the filling so hard that if there is a spheroidal tendency there is less opportunity for movement, and the filling does not seem to shrink. The second point is, it leaves a whiter surface. In reference to Dr. Clowes's statement that we are *blessed* with many amalgams, I would say we are *cursed* with many. It has been a strange thing to me that with the means we have, and the earnest desire that exists in the profession, that something has not been done before this in the way of the appointment of a commission or the establishment of some system by which something definite should be known about amalgams, so we should not use everything that is brought to our door. It is a pity that our profession has not settled upon some definite formula from which we may know what to expect. Amalgams have come to stay, although there are still some men who say they have no use in our offices. They have a greater field for usefulness than they ever had. I am sorry Dr. Kirk did not manage to condemn copper amalgam, but he could not do so in his paper, as it did not undertake to discuss different

kinds of amalgam. It is the most treacherous filling-material used by our profession.

Dr. Rhein.—The essayist in his paper kindly mentioned a method that I advocated in the use of preparing amalgam fillings, some years ago, at a meeting of the New York State Dental Society. In 1880, when I was a student of the late Dr. M. H. Webb, I was almost persuaded at one time to entirely give up the use of amalgam. You all recollect how earnestly he used to talk against the use of it in any shape or form. There never was a man who took a more decided stand against it. He would constantly call attention in his office to the defective results, and to the loss of teeth due to the bad results of fillings, where if proper ones had been inserted the teeth would unquestionably have been saved. At that time my attention was called to the use of gold in finishing off the surfaces of amalgam fillings. Strange as it may seem, Dr. Bonwill was then actively advocating the use of an extra amount of gold, and not bibulous paper, for the best results from amalgam fillings. He had put upon the market about that time an alloy with which a special form of mercury was to be used. This mercury was mixed to a certain extent with gold. In the use of gold to wipe up the excess of mercury and then remove it I did not get a uniformly successful result. The successful cases may have been seventy or ninety out of a hundred, but they were not uniformly successful, such as we would expect to get from gold fillings,—edges that we knew would remain perfect. About 1882 I accidentally hit on a method of inserting amalgam fillings that has given uniformly successful results. By that I mean that after waiting a week or so the amalgam could be finished off properly, and it would remain as perfect and with as bright a color as a gold filling. At that time, while using the Wolrob cylinders, some of them unravelled, and in endeavoring to make use of these for removing excess of mercury in amalgam fillings some of them would disappear under my eyes, and that was the end of them, and I never saw any more of those particular unravelled cylinders. I had tried before that to incorporate gold in the amalgam, but the gold I used was No. 4, and I never was successful in accomplishing it. It would eventually strip. Since then I have used a specially thin gold-foil (about No. 1), placing it upon an annealing lamp and using the proper judgment, so as not to get too large a percentage of the gold in the filling,—a necessity which I have appreciated by experimentation, that too large a mass of gold will unquestionably produce a softer filling. You can not only remove all the excess of mercury in this

way, but you can later finish the filling the same as one made of solid gold. In regard to the mass of amalgam that shall be introduced in a cavity, the essayist seemed to object to the operator having a specific weight for the different materials. I think you can obtain a more satisfactory result if, by experimentation having first settled in your mind how plastic you want your mass of amalgam to be, you have reached a definite proportion that the mercury should bear to the alloy. Of course this depends on what kind of a cavity you wish to insert it in. If you have a crown cavity, it is not necessary to have it as plastic as for contouring the side of a tooth. I have a status of figures that suits my convenience, by which I weigh out a certain amount of alloy and a certain amount of mercury. In that way I avoid the necessity of squeezing out any excess of mercury before introducing it. I would present this method to you because some of the gentlemen seemed to imagine that it was impossible to incorporate any of the gold so it will remain. I have never seen any gold that was introduced thin enough at the outset that did not become an incorporated portion of the filling.

Dr. Palmer.—In relation to what Dr. Perry said about gold not being incorporated, Dr. Smith has said he has done so frequently. I would like to ask Dr. Kirk what objection there is to allowing it to remain there. Or would it give the atomic result that he wants to reach?

Dr. Smith.—Possibly Dr. Palmer misunderstood me. I suggested to Dr. Palmer that I had used the crystal gold, having learned it from Dr. Kirk. It had not occurred to me to remove it after burnishing it on, but it seems to me, from the experience I have, that certainly a good deal of that crystal gold would remain in those fillings. I may be mistaken, but it seems to me to be so.

Dr. Perry.—It can be done, I know, with Dr. Klapp's method of filling the lower portion of a large cavity with amalgam, and then topping it with gold. Crystal gold is the only gold by which that can be accomplished. It is true that there can be an incorporation of the gold into the filling, by which a foundation can be established so one can go on after a few layers have been made and build on crystal gold, but I do not use it on the surface of a filling except to get out all the mercury I can. I do not try to incorporate it into the filling, and I think if you undertook on the smooth surface of an amalgam filling to pack on pellets of crystal gold and press them against the filling, you will find they will roll right off. The mercury will unite with the gold and harden it,

or if there is not an excess of mercury it will lie there inert and you cannot attach it. I presume Dr. Smith is right when he says you can take very small pieces of gold and rub it in when the filling is fresh.

Dr. George Allan.—Do you say you have never used copper amalgam?

Dr. Perry.—I have used it, yes; but now I do not use it. I am as prejudiced against it as our friend Dr. McKellops is against ordinary amalgam.

Dr. Allan.—Did you ever use copper amalgam as a lining to a filling and put ordinary amalgam over it, so the copper amalgam was not exposed at the edges?

Dr. Perry.—No, sir.

Dr. Allan.—Would you condemn it?

Dr. Perry.—I condemn it as I have used it.

Dr. Henry Burchard.—Since hearing the title of his paper I have been grubbing through the literature of metallurgy only to find what a paucity of knowledge of amalgams there is applicable to dentistry. In dental literature itself statements and opinions as to these matters are at present even less generalized and thought over than the stage of hypothesis. Dr. Kirk has clearly shown that much of empiric observation might have been and can be saved were investigators to be governed by the principles of some of the special sciences. Amalgams are usually treated by those who discuss the matter as though this combination of metals were a something *sui generis*. They belong to this general class of alloys as much as any other combinations, and should be so viewed. At a casual glance, one hypothesis seems to be one of glittering possibilities, thus, that the union of mercury with other metals is a fusion, and the setting of the plastic mass a mere physical solidification, due to the combined metals reaching a temperature less than the melting-point.

The one mercury at the temperature of the office is 110° F., removed from its point of solidification, and is molecularly in the condition of any other metal at a temperature one-fifth the way towards volatilization. It would seem, therefore, a safe hypothesis, that in this condition it would act towards other metals like a similar state, so that fusion in it would take place in the direct line of the melting-points of the metals added; thus, the solution of sodium, bismuth, antimony, lead, zinc, aluminum, silver, copper, gold, and then the platinoid metals, would form an ascending scale. Conversely they would solidify, crystallize in the reverse order, and upon once attaining crystallization there would be no further

change of form; that is, there will be no spheroiding. Admit the truth of spheroiding, and crystallization cannot have taken place; therefore there has not been a true chemical union between mercury and the alloy.

The fault of this hypothesis, as Dr. Kirk has shown, is that this union is more than a fusion, it is a chemical action, in some cases attended by the evolution of heat and subsequent crystallization, with the union of mercury and alloy metals in definite proportions; it is more than a physical mixture. Also the exceptions, such as aluminum for difficulty of solution and platinum in tardiness of setting, with others that might be named, compel us to a belief in a chemical affinity present.

The subject of washing amalgams has not been touched. The object of this process is the removal of discoloring matter. These are commonly oxides of the metals of the alloy. Should a discolored scum be present in mercury, it is an impurity, usually lead or antimony oxide, not an oxide of mercury, as this metal oxidizes only near its temperature of volatilization. This furnishes an argument for the use of redistilled mercury.

Unless it can be demonstrated that oxides are a desirable addition to an amalgam plug we are compelled to regard them at least as aesthetically undesirable. The only objection to the use of washing with alcohol is the possibility of water remaining in the mass; but as alcohol contains but five per cent. of water, it is questionable if any remains after expressing the surplus mercury. Certainly the washed plug maintains its color better than if unwashed.

A cut in Bödecker's new book shows a section of dentine with the tubuli containing metallic particles for some distance; the pressure used in inserting the plug has caused the escape of mercury and doubtless some of the metals of the alloy in solution into spaces of least resistance. The black metallic salt present here and in other cases must be a sulphide; the sulphur of combination, provided the plug be perfect, can only be derived from decomposing albuminous matter in the dentine. It is this decomposition with the evolution of H_2S which may account for the difference of behavior of two fillings both made from the same amalgam mass; under one there has been decomposition, under the other none. The cut to which reference has been made furnishes an argument for the lining of cavities which are to receive amalgam fillings: preventing the entrance of metals to the tubuli, it prevents discoloration. The other aspect involves the whole question of sterilization and the possible effect of mercury upon protoplasmic filaments.

In conclusion, I believe fully the solution of metals in mercury and subsequent crystallization to be a chemical process, and that Dr. Kirk's argument as to the use of an excess of mercury outweighs those contrary to it; that unless the solvent be present in sufficient amount to insure perfect solution the resulting filling is an indefinite mass in which we cannot accurately determine the effects of action and interaction.

Dr. Kirk.—I would like to speak of one point that has been left uncovered, and that is whether we should or should not leave the gold upon the surface of an amalgam filling, and also to speak of Dr. Rhein's recommendation that we weigh the proportions of mercury and alloy. I see no objection to that, but it is quite evident from his statement that in using the weighed proportions he gets an excess of mercury, and that excess of mercury he does get rid of by using gold as an absorbent. Dr. Rhein has made a strong argument in favor of leaving the gold upon the surface of his amalgam fillings. By so doing he has a substratum, or the main body of his filling, composed of a definite chemical compound of mercury with the alloy, and the surface of his filling composed of an amalgam of gold. Is the amalgam of pure gold a desirable thing to have on the surface? Dr. Rhein finds that it is. Then why not make the entire filling of gold amalgam? I have seen nothing yet to shake my faith in the principle which I have tried to bring out in the paper, that we shall take advantage of the selective affinity of the mercury to form definite chemical compounds with the alloys and to use those compounds as the body of the filling, by getting rid of the excess of mercury. I have made the test with respect to leaving sponge gold on the surface of amalgam fillings. It leaves a surface of gold amalgam, which is not as hard, especially on the masticating surfaces, as many of the alloys which we get already prepared for use as amalgams. Therefore I am inclined to think that gold amalgam is lacking in the proper qualities for a good filling. Dr. Hill speaks of washing amalgams. I have used them by washing them, and also without washing them. I see no theoretical objection to washing the amalgam, nor do I see any practical objection, except that it makes a nasty mess and is probably unnecessary. If an alloy is made with an excess of pure mercury, it need not be brought to a fluid state, but to a soft, buttery condition; you can wipe off the soiled mercury on your hand, then after the mass has thickened a little, by putting it into the chamois and squeezing it you get a very satisfactory condition.

Dr. Hill.—Are the metals that go out with the mercury the things you want to get rid of?

Dr. Kirk.—Yes. Do not understand me as broadly advocating copper amalgam. Copper amalgam is a term that means a great many things. I have in my own mouth copper amalgam fillings put in in 1883, for which I would not take a great many dollars apiece. The subject of copper amalgam is one of the most interesting problems in dental metallurgy. I think under certain conditions there may be a place for copper amalgam. Nobody will dispute the fact that there are some fillings of copper amalgam that have been doing good service and are good fillings now. It is a law of nature that under the same conditions like results flow from like causes, and if it has done so once, copper amalgam will do the same thing again, when we have discovered the factors in its successful use. I have seen good copper amalgam fillings and some abominable ones. We ought to find a place for anything that will help us in the successful adjustment of that series of compromises we are all continually making with dental caries that we call operative dentistry.

Dr. Perry.—The fact still remains that the manufacture of copper amalgam at the present time is so uncertain that to make use of it, to commend it, and to favor it, is to put into the hands of many men a very uncertain material, and until the time comes when we can make uniform fillings of it, I say let it alone.

Dr. Allan.—The only thing I have to say is to thank Dr. Kirk for drawing our attention so strongly to the fact that it is right and according to correct chemical laws to prepare our amalgams so that there may be a slight excess of mercury, the squeezing out of which carries with it a certain amount of alloy that would be not only useless but even injurious. The mercury unites with definite amounts of alloy to form definite compounds or mixtures. Any excess, therefore, of either mercury or alloy would remain only as an adulteration. The whole question of the combinations of mercury with the metals is very imperfectly understood.

I do not think the essayist would say that we have definite chemical compounds atomically combined, having fixed formulæ in the manner, say, that hydrogen and oxygen, or sodium and oxygen, combine. Again, what conditions or proportions form the hardest amalgams, and how can the contraction or expansion be reduced to a minimum?

Dr. Kirk.—My only object in coming here to-night was to bring out the one special point that Dr. Allan has alluded to. Every

metal which is added to the amalgam alloys of course confers upon it its own properties, and those properties vary in degree with the amount. As to whether there are chemical compounds formed under the circumstances to which I have alluded, the fact of the formation of a crystalline mass is very strong evidence, if not proof, that it is a chemical combination, and of which a formula might be written out. I gave the classification of alloys suggested by Matthiesson, in which he showed that they were either chemical compounds or solutions or mixtures of any of the three. The compound of mercury with zinc, the compound of mercury with copper or with silver, with gold, tin, and platinum, and a number of others, have all been worked out and found to contain percentages of each of the metals which accorded with the theory of atomic combination. Many of the alloys are simply solutions. The metals dissolve one in the other to an unlimited extent, without any apparent separation point, just as alcohol and water freely mix. In others, if you melt the two metals together and cast them in a cylinder form, you will have them separated in the order of their specific gravity. There is reason to believe that mercury enters not only into the chemical composition, but that it also stands in the same relation to amalgams as water of crystallization does to some salts. The sodium of amalgam is of that class. There is a definite crystalline compound of sodium and amalgam which has the formula NaHg_6 . We probably have a compound in that crystal in which the proportion of sodium to mercury, in the matter of atoms, is two of sodium to one of mercury, and the balance of the mercury affects the crystallization in the same way that water enters into the composition of certain crystals, alum, for example. There are a great many analogies between alloys and the combinations of metals with non-metallic elements. In dental amalgams these chemical compounds of the metals do exist.

One other point in relation to Dr. Allan's question. The order in which these metals are put together does make a difference. We know where platinum is alloyed with tin, we get a definite compound of tin and platinum, and it will be dissolved in the excess of whatever element happens to be associated with it. We generally add a small amount of platinum to a large amount of tin. Therefore we will have a tin compound of platinum dissolved in tin. If we amalgamate that, we will get an amalgam of tin and platinum in combination. Or we may dissolve the platinum in the mercury, and as there has been some question whether that could be done, I will state that I have seen it done, and that it is used for coating

steel for certain purposes. Pure platinum amalgam is a soft buttery mass that does not set very well. By mixing together the tin amalgam and platinum amalgam we will get a different combination from that obtained in the first case by amalgamating an alloy of tin and platinum. The order of mixing the alloys is a very important one, and will give different results. I have only mentioned these things. The main feature I wish to bring out is the one central line of thought in the paper, and that is the question of true chemical compounds as the basis for amalgam fillings. The rest would require a volume to illustrate and elucidate.

A unanimous vote of thanks was offered to Dr. Kirk.

Adjourned.

JOHN I. HART, D.D.S.,
Editor New York Odontological Society.

ACADEMY OF STOMATOLOGY.

A REGULAR meeting of the Academy of Stomatology was held at the rooms of the Academy, 1731 Chestnut Street, Philadelphia, February 12, 1895, the President, Dr. Louis Jack, in the chair.

After the transaction of routine business, Dr. Edwin T. Darby read a paper upon "Gouty Pericementitis."

(For Dr. Darby's paper, see page 197.)

DISCUSSION.

Dr. M. L. Rhein.—Mr. President and Fellows of the Academy,—I have had much pleasure in listening to the paper read by Professor Darby, and am sorry he was not present during the summer at the discussion on this subject, when a similar train of cases was presented before the American Dental Association at Old Point Comfort by Dr. Crouse, of Chicago. Dr. Crouse very graphically described the cases and dwelt at length upon the fact that these molars were attacked individually,—precisely in the same way that has been illustrated in the paper this evening,—that nothing was left to him but to extract the teeth, and that he had found this condition of affairs on the end of the root. After he had taken his seat one of the members of the Association from New York took exception to Dr. Crouse's statements, inferring that he was not competent to observe properly. I suppose what I say may recall it to the memory of many of the gentlemen who

were present at that meeting. I personally felt like verifying the accuracy of Dr. Crouse's statements that such pathological conditions did exist. That they have not been more frequently reported is unquestionably due to the difficulty in diagnosis and the common method in which we relegate at the present time the extraction of teeth to the specialist in extraction, when we, as a rule, do not see the teeth that are removed by them.

The point that interested me most was the question of the proper nomenclature of this subject. I presented a hastily-written article on the etiological classification of pyorrhœa alveolaris at the last meeting of the American Dental Association, which was published in a recent number of the *Dental Cosmos*, and in that article I claimed that we had no right to depart from the beaten and accustomed track of medical science generally in classifying a disease and subdividing the classifications according to clinical appearances, but ought to follow what has held sway in all the departments of medicine, and classify strictly according to its etiology. Now, my experience with all pericemental inflammations has been that they are as prolix as the diseases with which we are liable to meet, and that the clinical results that follow vary more or less in their symptoms and appearances according to that cause. That we may meet with some much more frequently than others, and that some cases may be more common in certain sections and in certain classes of people, seems a very reasonable conclusion. In that article I preferred to retain for all forms of pathological condition, where there was or may have been a flow or an exudation of pus from the gingival border, the name by which it was most commonly known,—that is, pyorrhœa alveolaris,—and then subclassify it by adding as an adjective of any case the etiological cause of such particular case. That is to say, the cases as presented this evening, after we had obtained a condition of pyorrhœa alveolaris, after there had been a pocket formed with suppuration, could be called pyorrhœa rheumatica or arthritic rheumatica, according to the wish of the party describing the same.

Now, I also recognize the fact that the condition of affairs existing in these cases that seem to be rather rare to us at the present time, whether they are as rare as they seem, is an uncertain thing at present. But it seems to me that such cases where suppuration does not exist,—where we simply have a deposit near the ends of the root that acts as an irritant,—it seems to me that we could not call that a condition of pyorrhœa. We do not have that condition present, but we do have present a condition of pericemen-

titis, which is very liable to develop into a condition of pyorrhœa alveolaris. The moment we refuse to adopt a common name and then subdivide it according to its etiology, we are bound to be met continually by the differences of opinion, by different men from different parts of the world, not understanding the particular case under description. Last summer I spent some time in visiting the medical wards of one of our large hospitals in New York City, and examined the mouths of the patients there, from the incipient stages of typhoid fever to the convalescent stages, and also a number of cases of chronic invalidism that were in various stages of treatment. In none of these cases was there such a condition as a healthy mucous membrane. The point I wish to illustrate is, that wherever we get a nutritive starvation, there is not sufficient to thoroughly supply the human economy with pabulum for the amount of wear and tear of the daily cell-life; the part of the tissue that is soonest to feel that paucity of newly-made blood-corpuscles for enriching the supply would naturally be the remotest portions of anatomy,—that is, that portion that is reached by the remotest capillaries of any portion of the circulatory system. And in that part of the body we certainly are aware that the capillary system supplying the peridental membrane and the gingival border along the roots are the remotest portions, and these conditions seem to be theoretically the only outcome right there of malnutrition.

In all these typhoid-fever cases there was more or less a condition of pyorrhœa present around the gums. In some it was very marked. I call particular attention to this point to emphasize the necessity in my mind for this sort of classification, for if my observations are correct, we are liable to a pyorrhœal condition in any form of disease that will subject the nutritive action to a lowered standard. This is a point upon which I would like to bring out a reply from the writer of the paper, principally because at the commencement of his article he devotes considerable attention to the admirable papers of Dr. Peirce on this subject, and it is merely a question whether it does not draw the line too closely around a very large and much wider circle than the one form of gouty disease can possibly do.

Dr. M. H. Cryer.—In Dr. Darby's paper he described an apparent abscess opening on an upper molar tooth. Since our last meeting a patient, whom I have had some eighteen years, called, complaining of a second bicuspid. On examining it over the root I found an abscess, and on tapping the tooth it responded as though there were pericemental inflammation, and indicated a devitalized tooth.

In drilling it, rather carefully at first, and no response coming, -- I perhaps ran the engine a little fast,--the patient made a sudden jump, and, hastily removing the instrument, I found blood. On examining the tooth I found a vital pulp. The abscess was not immediately over the point, but very close. The first molar had previously been devitalized, and, finding this condition, I removed the filling and dressings, but found them in perfect condition. After exploring the roots carefully, I came to the conclusion that the molar tooth had nothing to do with the abscess. Knowing that Drs. Kirk, Darby, McQuillen, and Huey would meet at Dr. Darby's office yesterday, I asked the patient to call around. Dr. Darby kindly removed the dressings in each tooth, and I believe that these gentlemen support my opinion that the abscess is at or near the apex of the bicuspid tooth, and that the bicuspid tooth, or something associated with that tooth, is the cause. On taking out the dressing yesterday morning there was a very large flow of blood, although the tooth had been comfortable for several days. This blood could not come from any other than the inflamed condition down through the tooth, although the pulp is vital.

I would like further to speak—for it is bearing on the subject that we have before us—of an abscess opening on the face, apparently coming from a diseased tooth. A member of this society a year ago sent me a patient with a swelling on the lower jaw just opposite the second molar. The first molar, a devitalized tooth and filled, did not respond to any percussion, and appeared to be in a good healthy condition. I sent the patient back to his dentist, with the suggestion that it should be closely watched; if the swelling should increase or the tooth become painful, the tooth should either be opened—that is, the filling removed and treated—or extracted. If I remember aright, the patient did not go to his dentist for over three months. He finally came back to me with an abscess about ready to point. I lanced it and passed the probe into the opening in the direction of the first molar. There was not any time to waste, so the tooth was extracted, and then with very little trouble the probe was passed from the outside into the alveolus and out through the opening into the mouth. I found the edge of the bone somewhat diseased, so I bored it away with the engine and packed the parts with iodoform gauze, passing a part of it out through the opening; the parts healed almost immediately, and within a week's time the patient was discharged.

I have taken the liberty of bringing a patient here to-night who had trouble with a second molar, very sensitive, all the indications

of pericementitis. The tooth became so painful it was extracted last September. It was swollen on the outside along the lower portion of the bone, increasing in size, and, becoming more painful, a physician lanced it, getting a small amount of pus. This happened last September, and passed into my hands in the latter part of December. In passing a probe through the opening it went to the bone; then, by curving it, I passed it under the bone, and on placing the finger could recognize the point of the probe under the mylo-hyoid muscle. The parts were syringed with a peroxide of hydrogen solution and showed some evidence of pus. Of course the serum will cause the frothing or bubbling, but from certain experience it was evident that there was also pus in this pocket. The part was opened slightly, iodoform gauze was packed tightly down to the bottom, passing a portion of it out, and leaving it hanging out of the opening. This treatment was carried on until it was impossible to repack it, and it had all the appearance of getting well, but in a few days the pus began flowing again. About three weeks ago I had him before a clinic, and examined by one of our celebrated surgeons and one or two others. We all, however, failed, I think, to make a diagnosis. At this time the parts were opened considerably and a probe passed in the end, and the treatment was carried on as before with the hope that this time it would cure, but it failed. The next day after it was opened part of the fluid taken from the opening was examined under the microscope, with no result. There has not been enough to make a chemical analysis to see if it is from the salivary glands, though it is possible to have saliva flowing in this region. The serum has been put under cultivation to see if any tubercular bacteria would develop, but such has not been shown. On a second treatment those who had not seen the wound before were satisfied it was going to close, but that was the supposition of all who had seen it for the first. It finally did close, but on the second day there was again this discharge. The family history is good, there being no specific taint. I should like our friend from New York and others here to see the patient and see if he can find a diagnosis. The diseases of the pericementum and the inferior maxillary are so close that I think it really borders on it. But at Dr. Darby's suggestion the discussion will go on and we will see the case afterwards.

Dr. Howard Roberts.—Dr. Darby makes the remark that he seldom sees pyorrhœa in a patient under thirty. I wish to say that I have a patient, who is not over twenty-six, that I think has the most

stubborn case of pyorrhœa I ever saw. And it started two or three years ago. The two bicuspid—one on either side—are very much affected, one of them is very loose. There is not much discharge of pus, and very little inflammation. I should like to know a treatment for it that will cure. I have now put her on tartrate of lithia to see if that will have any effect.

Dr. E. C. Kirk.—I would like to speak a few words about these abscesses that form in relation to the acute condition. I reported at the last meeting of the Academy some abscesses of this sort that I had observed in the mouths of patients, and also that I had very closely observed in my own mouth. Since the last meeting I have been watching these cases, and they have developed one or two features which seem to me to be interesting. They are interesting as showing what may be called the mechanical factors which determine to a certain extent the character of pyorrhœa. I have seen two cases where a pericemental inflammation resulted in the formation of a discharge through the gum tissue. I would not characterize it as pus, and I question whether the condition would be characterized as an abscess. However, the inflammation resulted in a formation of a discharge on the gum surface. It did not break through between the alveolus and the gum tissue and discharge at the gingival margin, but directly out through the tissue upon the gum. And that inflammatory condition healed almost at once.

I think we have all seen cases of alveolo-dental abscess terminate in the same way,—those which start and heal up without the formation of a chronic fistula. On the other hand, I have observed cases of acute abscess, such as Dr. Darby has described, where the fistulous tract was established between the soft tissue and the tooth-root,—that is to say, the discharge took place on the gingival margin and a probe could be passed down almost to the apex of the root. Now, this case refused to heal up, and has continued to present an appearance of one of the forms of pyorrhœa alveolaris.

There is another feature which seems to me related to this point,—the character of the tissue as a modifying factor in which the inflammation is expressed. Dr. Darby has drawn attention especially to the pericemental membrane as the seat of this inflammatory condition, and draws an analogy between the gouty inflammations of membranes and this and other ligaments. In Dr. Black's book upon the histology of the pericemental membrane, and more recently, he has called attention to the existence of true

epithelial glandular structures that are certainly found in that tract, and in a later publication—if I mistake not, it occurred in the *Dental Review* in criticism of Dr. Peirce's paper—he stated positively and without qualification that this glandular structure is situated in what he calls the gingival space, and is the seat of pyorrhœa alveolaris. Now, when Dr. Black makes a statement in that manner he certainly believes that it is correct, and he has made it in the light of careful investigations; therefore, for our purpose we can accept that it is true, and I call attention to it because it has a bearing on certain cases of pyorrhœa.

About a year ago a patient presented herself to me with her teeth all perfectly sound. Less than six months after that she called for an examination, and I found erosion taking place, slight, comparatively, and yet it was rapid, having all been established in the interval between her two visits, and seemed to be of such rapid progress that I decided that it was best to fill these cavities. I remember having some difficulty in trying to decide whether I should or should not fill with gold. I saw her the next six months after that, and I was horrified to find that these fillings which I had inserted were standing up like islands in the midst of the sea, the tooth substance melting away from around them, with the enamel for a considerable extent beyond them rather chalky-looking as if it had been immersed in a dilute acid. I then began to note the general condition of the patient, and I found that she was exceedingly plethoric, full habit, florid, looking as though she might at any time be stricken with an attack of apoplexy, and the gums presented the same turgid engorged appearance. I called her attention to these points, and suggested that she consult a physician. As she had no family physician, I sent her to a medical man in whose judgment I had confidence, and asked him to give me a report of her physical condition. He wrote me a letter within a few days stating that she was a marked and typical case of uric acid diathesis, and that accounted for her systemic manifestations. On her next visit I spoke to her about her condition, and she said that she had been in Europe at various spas for treatment, had been in Carlsbad, and under treatment for it before, but she had developed either there or at some place in her continental tour a goitre, for which she was under treatment here and was taking thyroid extract. Within a week or ten days afterwards she came to me and said that some one had told her that thyroid extract is little less than a solution of uric acid. Her physician had insisted that she should take it to cure

the goitre, but, as she said to me, Why should I take this solution of uric acid if it is going to have this effect on me? I confessed it was a reasonable proposition, and, on her own responsibility, she stopped taking thyroid extract and went under a treatment with lithium bitartrate. In the course of two or three months her goitre had left her, her thyroid gland had become reduced to nearly normal, the condition of her mouth was entirely changed, she had lost that full, engorged, plethoric, hyperæmic appearance, and she felt like another person. She has been keeping up a modified gout regimen, and there has been certainly an arrest in the progress of her erosion.

It seemed to be a very interesting observation to find the effect of uric acid upon the glandular structure of the thyroid as well as of the labial mucous glands, which we now know to be the cause of the erosion; and that these two causes, in connection with the possible glandular involvement of pyorrhœa, are produced by uric acid condition are points which seem to me to be worthy of consideration.

Dr. Rhein.—There was a word that I wanted to add that escaped me at the time in reference to the cases Dr. Darby mentioned, and that is the treatment of those cases. I have had a little success in some of those cases by following a strictly surgical line of treatment,—practically the same method that we would pursue if we had a pocket at the gingival border. Invariably I have devitalized these pulps. It is my opinion that the pulps in such teeth are better devitalized than left to perhaps a worse fate.

Dr. Kirk.—Why would you destroy them?

Dr. Rhein.—There are a number of possibilities. There is a possibility of uric acid deposits in the pulp itself. To my mind, if it is possible to obtain these deposits around the periphery of the tooth which receives its supply from the same vessel that simply divides up around the end of the root, it is just as possible to get some form that we speak of in a rough manner, a pulp-stone in the pulp itself, and produce some of those terrible neuralgic conditions that we meet with of that cause. At any rate, it has become a common practice with me to immediately devitalize these teeth.

Secondly, it is my custom to remove a portion of that root, if not the entire root that is involved. In a superior molar I have removed one of three roots so frequently, and the results have been so gratifying to me, that it is an operation that I look on with a great deal of favor. There is no other tooth in the mouth that permits of such an operation with such gratifying results as

a superior molar; and I want simply to point out this method of treatment for the salvation of teeth that are attacked in this manner, especially if only one of the roots be involved; and while it is a little foreign to the subject, in a number of cases of pyorrhœa alveolaris where the surrounding teeth are liable to infection from the pericemental root, which we find in older people entirely denuded, the superior molars do good service.

Dr. H. H. Burchard.—What Dr. Rhein speaks of as advisable to do, nature does herself in a great many cases. In a paper read before the County Medical Society some time ago, I assumed that in patients the subjects of the gouty diathesis the morbid conditions would not break out with volcanic force. It would be existent over a long period and the acute outbreak was the culmination. In all probability the excessive uric acid condition exists for years before there is an acute manifestation.

Cell activity emphasizes itself in several ways. Probably the first form is in higher organization,—that is, in many parts formed material becomes harder, and so on, acting upon the odontoblasts, the peripheral cells of the pulp, they are stimulated to a greater activity, and the dentine becomes more dense. Continue the irritation long enough in the proper degree, and there will result self-obliteration of the pulp. This is an early stage of disease-action, the stimulative. The next stage in severity will be the irritative. One of the characteristics of this is altered secretion. In a discussion of a most excellent paper of Dr. Darby's, read some few years ago, Dr. Kirk advanced the opinion that the acid, the cause of gouty erosion, was the product of the mucous glands about the part. Dr. Brubaker has recently written upon this subject also. The irritated secretory apparatus produces altered products, acid in reaction, and these act as decalcifying agents. The third stage, following the stimulative and the irritative, is the necrotic. At this point, I really do not see, if the loss of a tooth occur through—I will not call it pyorrhœa alveolaris, as this term merely names a symptom, not a disease—a progressive degeneration of the pericementum, and due to the presence of uric acid in the circulating fluids, why there should be deposits, and why pus-formation, granting that pus always represents micro-organisms, which I do not believe. If this loss of articulative tissue be a purely gouty affection, the pathology of this type of pericementitis should accord with that of gout in any other articulation. Ebstein states that necrosis precedes deposits in gout,—that is, necrosis of the tissues precedes the deposits of urates in an area. Preceding the necrosis

there is an inflammation of the blood-vessels. One of the effects of this is swelling of the tunica media. In small vessels this may be sufficient to occlude the lumen, and there will be death of elements dependent upon this vessel. I forget what pathologist states that necrotic tissues in this disorder particularly have an acid reaction. The urates insoluble in acids are precipitated in this area, a chemical reaction purely. I believe in and have found the association frequently of a gouty pericemental degeneration, which begins, not as the preceding, near the apex, but just beneath the margin of the gum. I am not yet convinced of the presence of epithelial tissue in the pericementum; but even though mucous glands are the only ones about the gingiva, their altered secretion may serve to cause deposits from the saliva. The disease progresses then as any inflammatory degeneration. These may be gouty cases, and yet may be curable by keeping them free from deposits.

Dr. S. H. Guilford.—Pyorrhœa alveolaris is a disease that expresses itself in various ways. I remember the case that Dr. Darby referred to, the first case he mentioned, because we were then neighbors; calling upon him the very evening of the day that this case occurred, he asked me if I had ever seen a case of abscess where the pulp was alive? We thought it very wonderful in those days, and yet we would not think so to-day.

Shortly after that there came to me at my office a negro policeman who was suffering with one of his upper molar teeth. The tooth was perfectly loose and the gum very much inflamed. I extracted the tooth. He was one of the finest specimens of physical development I had ever seen, and yet was subject to this peculiar condition. I kept the tooth very many years, and I think I may yet have it somewhere, because of the extent and character of the deposit on the root.

Not long ago a lady came to this city from Pittsburg who had been under treatment there by a dentist, and as she was coming here she was referred to me. She had a very beautiful set of teeth, but around the superior left lateral incisor the gum was very much inflamed and it was receding from the neck of the tooth. It gave her a great deal of trouble, and she wanted some relief. I examined the case for some time very carefully indeed, and saw it a number of times, extending over a period of several months. The characteristics were entirely different; there was pain, inflammation, and erosion; there was loosening of the pericementum, but no deposit at all upon the root that I could possibly find. I took a probe time and again and passed it up almost to the apex of the root, and

with all the care that I could exercise I could not discover any evidence of the deposits. There was no flow of pus; in fact, no discharge of any kind. I advised the removal of the lateral incisors, but she decided not to have it done.

I met the physician who had charge of her afterwards. He asked me what success I had had, and I said, none. I was able to learn that she was troubled with inflammation of the ovaries, and the physician had been trying to help her in various ways, but was not able to do so. He advised a surgical removal of the ovaries, but she was not willing to have it done.

In her case, I think, it was nothing but a reflex manifestation or exhibition of the disordered condition of her ovaries; nothing more than an abnormal condition of one part showing itself very markedly in the teeth.

I mention it particularly because there was an entire absence of any deposit on the teeth, or of pus, serum, or any discharge whatever.

Dr. A. W. Deane.—At one of the previous meetings I reported a case that has come under my care, of two of the lower incisors, the pocket having formed beneath the gum margin and worked itself out to the surface. As I said at that time, I placed her under Dr. Peirce's treatment and gave her unlimited quantities of lithia, and the case has responded very favorably; but her physician steps in now and says that she must not use lithia; there being a trace of consumption in the family, he is afraid that she would develop something, he did not know what, from the use of lithia. What I want to know is whether she shall change her doctor or change her dentist. The pus has entirely stopped in its flow, and her general health seems better. I have never before heard of any advice of that kind coming from a medical source.

As to what our New York friend suggests as to devitalizing the teeth, in a paper by Dr. D. D. Smith, recently read before the Odontological Society, he advocates devitalizing the pulp in such cases.

Dr. Burchard.—Judging from what has been said about the ages of these patients, it would seem to me that too much attention is paid to that detail in regard to diseases. There is no reason why a disease that breaks out at thirty should not appear at the age of twelve or thirteen or fourteen.

For instance, encephaloma has been found in a child eighteen months old, and it is well known that it never makes its appearance except in adults. These things simply teach that there are excep-

tions to the general rule, and general rules in medicine are of but little value.

Dr. Jack.—The chair has three cases bearing upon this subject, which are each of different character, that he would like to state.

CASE I.—Mr. W., left upper central. Tumefaction and abscess of gum. Tooth was alive. A patient nearly fifty years of age, of gouty diathesis, subject to neuralgia and severe headaches. The attacks have been frequent and maddening. Habit full, complexion florid. Applied with swelling of the gum over left central and lateral. Teeth but little sore. Margins of gum red, with very thin scale of black tartar beneath them. At the central portion, over the middle of the central incisor root, there appeared a small fluctuating spot which when opened discharged a couple of drops of pus. The bottom of the excavation did not apparently reach the peridontium; the cavity of the abscess was defined, globular in form at the bottom, and shining. After removing the salivary calculus the parts became restored to health. The pulp in each of the teeth was vital and their color normal. Since then a deposit of the same character of calculus has appeared, accompanied by tumefaction of margins of the gum, but without the appearance of pus.

CASE II.—Mrs. N. Right upper central incisor had repeatedly appeared with tumefaction of gum over the tooth extending from near the margin to the connection with the lip. The appearances presented the same character as the early stages of alveolar abscess, but without the usual characteristic soreness of the tooth to pressure or percussion. On testing found it sensitive to cold. With each attack the tooth appeared to lose its healthy tinge. After many years the tooth lost its temperature sense, when from the changes of color, some soreness occurring in connection with the tumefaction, it was decided to remove a cervical filling and drill into the pulp-chamber. I may state that the period during which this tooth was under observation was twenty years, and these attacks were not infrequent. In a moment sensibility was manifested. A year or more afterwards the patient asked that the pulp be destroyed to enable the tooth to be bleached. This was done, the pulp being found fully vital. The peculiarity of the case is this, that in many instances these attacks immediately followed the taking of wine, the patient averring that she could not use wine without an attack supervening. The patient was evidently of gouty diathesis, which at the first—which was twenty years ago—was not indicated except by the appearance of considerable erosion of the teeth, but of late

years this is markedly her condition, since the joints of the fingers show unmistakably the tendencies in this direction.

I present these two cases for what light they may throw upon the discussion of the last meeting upon the subject of the influence of gouty diathesis upon the tissues contiguous to the teeth.

CASE III.—Mrs. R. A further case of somewhat different character, but indicative of the influence of this gouty diathesis upon the peridental membrane, may be related in this connection.

A patient came complaining of reflected pain in the teeth of both sides of the face. She had several capped pulps, and while there appeared no reflection of the pain to the ear, which is an almost invariable accompaniment of pulp irritation, I made the usual external application over them without any benefit. On her second return the complaint was of soreness of all the teeth, which prevented her from using them at the table. An examination revealed the fact of the existence of peridental irritation of nearly all the teeth. I advised her to apply to her physician for treatment for apparent lithæmia. He confirmed this diagnosis. The patient undoubtedly possessed a strong inherent tendency to gouty disturbances, and had been treated for other gouty manifestations. Moreover, the inheritance in her case is undoubted.

Dr. William H. Trueman.—This is not a subject that I have made a special study, for my inclination runs in another direction. I think Dr. Darby in his paper stated that these diseased conditions are rather on the increase. I think that the reason is that these conditions belong to middle life and beyond, and at the present time more of our patients have reached middle life than we had twenty years ago.

I suggest to those who are especially interested in this subject that it may save a lot of threshing of old straw if they were to take the literature of this subject and read what has already been published. They will find plenty of books on it. They think that dentistry is but a few years old. In 1858 there was sold in London a house that had been occupied as a dental office for nearly two hundred years. It had to go to make room for improvements. Dentistry is not a modern science. I hold in my hand a book upon the subject we are discussing—“Morbid Conditions of the Gums”—published in 1722. These subjects have been considered by students of years gone by. You will find in the literature of the subject quite large treatises—text-books—which refer to the subjects which we take up as being new discoveries.

Dr. J. A. Woodward.—A young gentleman, twenty-two years

old, of full habit, a high liver, and of moderately heavy circulation, developed an excessively sore mouth: that is, last spring he went abroad, and while on the Continent he returned to London with this sore mouth. He fell there into the hands of a physician, and then a dentist; the latter did best. He came back to me in October with one of the worst inflamed mouths I ever saw. On examining the teeth carefully there was no tartar, there was no pus. The tooth was tender to pressure, and to heat and cold. I of course tried to get the mouth into some sort of condition as to cleanliness. He could not bear any brush. The softest brush I could get could not be borne, so I had to resort to mouth-washes and to antiseptic treatment. In despair I turned him over to one of our prominent men here, and that gentleman started with the same idea that I had,—that it came from the stomach, and was from smoking.

He got nothing out of that. I examined the teeth on Saturday. I found the mouth very much improved, the swelling had disappeared, the gum had returned to its natural color, the teeth were still loose, but the man was able to brush them. I wrote a note to the gentleman, and this is his reply: Mr. R.'s mouth offered a very obscure problem, and I changed nothing for him until I made up my mind that the condition was gouty.

On motion the subject was passed.

GEORGE D. B. DARBY,

Secretary.

Editorial.

SPECIALISM IN DENTISTRY.

It is probable that had the medical teacher of fifty years ago been told that in a half-century the practice of medicine would be divided into many subdivisions, each containing a body of men specially trained for a given work, he would have turned an incredulous ear and declared it impossible. Even as late as twenty-five years ago the specialist in medicine was regarded with as much disfavor as was the dentist, and looked upon as only one remove from the empirical pretender of the period. In the evolution of things these facts are forgotten, and only remembered by those

whose experience sharpens the memory. The present generation know next to nothing of this, hardly as history, yet it was a familiar fact at the period named. The man of special work has become the most active and the most valuable in medicine, while the general practitioner may have lost nothing of his prestige, but has gained in proportion to the progress made in special investigations.

This passing thought over general medicine leads to the question, Will dentistry that had an independent origin and development pass from a separate profession to that of a special branch? That this evolution is in progress, and rapidly so, no one can dispute who is familiar with the facts. It is not likely that the dentist of the future will be educated first in medicine and subsequently in dentistry. Certainly it is hoped this day will never come, for it would truly mean a change in the entire work of dentistry, with very questionable results as to practice. There should and doubtless will be a gradual development along medical lines of study, the curriculum being steadily advanced until it comprises all the essential branches of medical instruction. This is already an accomplished fact in the university departments throughout the country, and the course of study is steadily increasing to an extent not appreciated by those unfamiliar with the work. That this course must be followed by the independent schools is certain; for if not, then they must drop out of the contest. The lengthening of the course in these to correspond with the university sessions will probably determine this question in a very few years.

The next and correlated thought suggested is, What will be the result of this inevitable change?

Dentistry in its origin necessarily embraced almost entirely the mechanical idea. The purely professional had no place, and could not have had under then existing conditions. Beyond the occasional filling and the manufacture of artificial teeth, the dentist of the thirties made no attempt to advance. The professional side has developed slowly but surely, until now, near the close of the nineteenth century, we are brought face to face with the fact that to continue as it has is an impossibility, especially in the large centres of activity.

If, then, this be true, and it is difficult to regard it in any other light, it becomes the part of wisdom to direct thought in this direction, that in the final subdivisions there may be, at least, an attempt to improve these special branches that they may, in no degree, be inferior, but that each in its way may be worthy of entire respect.

It is clear that the twentieth century dentist will be occupied, not, as now, with all sorts of work, but will be with one of the following branches: pathology and therapeutics connected with general operations in the mouth; the surgical treatment of cases in the oral cavity; the preparation and insertion of artificial dentures; the preparation of metal crowns and improved bridge-work, and the extraction of teeth.

That this is not a utopian idea is apparent from the fact that this is already accomplished, in a large degree, in our cities. The dentist there, as a rule, has long since ceased to make the teeth he inserts. The surgery has passed into the hands of special workers. The crown and bridge-work, especially the latter, is in the hands of the specialist to a large extent. The processes of filling, treatment, etc., belong to another class; and extraction has almost entirely passed out of the hands of the general practitioner.

This is the present status, but is it satisfactory? In many respects the answer can be in the affirmative, in others not.

The great defect, it seems to us, exists in the mechanical branch. We have many very capable specialists in the mere mechanical details. They have attained the perfection of the jeweller's art, but they can go no further. Their work ceases here to be taken up by the general operator, neither working in entire harmony with the other, and both operating without much regard to conditions necessary to make an artistic piece of work. This specialty should be made an art worthy the life-work of any individual. The time is past for the horrible distortions met with. The prosthetic specialist, instead of being merely the skilful mechanic, should make the facial characteristics a study, have some knowledge of temperaments, study the rules of articulation, in a word, combine in his work all that is meant by the word artistic. He should be given the entire management of the insertion of an artificial denture, and thus bring it to a perfection that "art will conceal art," and not, as now, make it the most prominent feature of the work. In this way only, it seems to us, can this important specialty receive the attention it must ever demand. It should be evident that a dentist in full practice has not the time to look after artificial work of any kind; and if he has not the time, it cannot be done with that perfection and attention to artistic details most to be desired. The man who undertakes to do everything will, like the "jack of all trades," end in doing nothing well.

The views on mechanical dentistry apply with equal force to other branches of our work.

The extension of treatment in dental pathology has become so important and, in degree, intricate, that the ordinary dentist is entirely inadequate to meet it. The same applies to the work of the surgeon, a growing and most important work in dentistry.

The foregoing thoughts are given more as suggestions, and without any expectation of a speedy fulfilment; but it seems to us the dentist of the coming time should set his house in order and prepare for the work best adapted to his tastes and mental qualifications.

EXPLANATION.

THE serious illness of the senior editor through the entire month of February prevented him from taking his usual place in the editorial pages. Our readers lost nothing by this, and he wishes here to express his grateful thanks to his colleagues for their timely aid under trying circumstances.

THE "DENTAL DIGEST."

WE quote the following interesting piece of information from the February number of this new journal:

"The paper on the 'Relative Penetrating Power of Coagulants,' by Dr. James Truman, has the double distinction of being published also in the *Dental Cosmos*. The paper, with numerous experiments, was prepared to show the penetrating power of coagulants rather than diffusion. After taking finely attenuated tubes of glass and *partially filling them with albumen and glycerin*, various coagulating and non-coagulating agents were applied to the surface of the mixed liquid in the tubes. . . . (*As glycerin is not found in the pulp of a tooth or the protoplasmic contents of the tubules, we fail to see anything conclusive in these experiments.*) *The essayist did not succeed in diffusing chloride of zinc through the root of a tooth at all. . . . (So far no experiments have demonstrated the passage of a coagulating agent through the side of the root of a tooth without first depriving it of its coagulating property).*"

The writer of the paper alluded to in the foregoing paragraph never willingly notices adverse criticism, recognizing the fact that each individual has the right of private judgment, and further, he regards legitimate criticism as a valuable aid in the development of thought, even though it be, as it often is, unscientific.

The paragraph quoted under the pretence of being a digest, in fourteen lines, of a paper containing three months of careful work, is so thoroughly false that one is forced to the conclusion that it was either written by an ignoramus or one who purposely and maliciously gave a character to the paper it never possessed. As the new journal has never had the moral courage to give the name of its editors, it is impossible to understand the probable motive for the paragraph. The writer of it, if he had the mental capacity to know anything, should have understood the reason for the use of glycerin, as it is clearly explained in the text, and further, the tubes were not "*partially*" but thoroughly filled.

The statement that the writer of the original article was never able to "diffuse chloride of zinc through the root of a tooth" is *absolutely false* from beginning to end; and in proof of this we quote from the article: "*In the specimens prepared for the microscope, the evidence is positive to the trained eye that every tube is filled with coagulated organic matter, and this has been so frequently repeated, and with precisely the same results, that I have no hesitation in accepting it as a fact.*" It is true the writer failed to verify Dr. Kirk's experiment, but even this may not have been conclusive.

A journal that begins its career by making false statements can never hope to win the confidence of even its friends, much less the general profession. It has so far failed in making a respectable summary from the dental journals, and it is, therefore, not remarkable that some one on the editorial staff, in the February number, fails to understand the meaning of the word "digest." With this conclusion the reading members of the dental profession will fully agree.

Domestic Correspondence.

A NEW METHOD OF REDUCING DISLOCATION OF THE JAW.

TO THE EDITOR:

SIR,—Under the head of "Selections" in the February number of the INTERNATIONAL DENTAL JOURNAL appears the following:

"Dr. Roth seats the patient in an ordinary chair, and stands before him with one foot placed slightly to the right side and the other just in front of the patient and in the middle line. He then flexes himself at the hips and causes the

patient to lean forward and to place his forehead at the middle of the operator's sternum,—but this position varies with the size of the patient's head. The operator now flexes his neck so that his chin grips the patient's head about the upper part of the occipital bone, thus acquiring a firm hold with the head well under control between his chin and chest. Now the thumbs, protected in the usual manner, are placed in the patient's mouth, and the fingers of both hands grasp the lower jaw.—*The Medical Age.*"

The late Professor Wildman, of the Pennsylvania College of Dental Surgery, taught this method in 1870-71. The difference being that a common low chair was used so that the operator standing in front and above can obtain a good leverage with his arms and hands. The patient leaned forward and the operator over his patient readily carried the jaw back into place. I have practised this method ever since. The only difference between the method of the late Professor Wildman and the "new method" seems to be in the operator holding the head of the patient with his chin. In connection with the description of reducing a dislocation of the lower jaw he used to tell the following story: A lady living near a prominent surgeon in Philadelphia was a chronic scold; when the mania came on she would continue her scolding until her lower jaw slipped forward and out of the sockets. She would visit her surgeon who would replace it without difficulty. Finally her scolding spells became so frequent and the necessity of a surgical operation so often that the surgeon became annoyed. Seeing her enter his office one day with her mouth open and jaw protruding, he seized a chair, invited her to be seated, and as she did so the chair was pulled from under her, and the jar she received upon striking the floor threw the jaw into its natural position. The surgeon was never troubled afterwards.

Respectfully,

EUGENE S. TALBOT.

Current News.

TRI-STATE MEETING.

THE joint meeting of the Dental Societies of Ohio, Michigan, and Indiana will occur June 18, 19, 20, 1895, at Detroit, Michigan. The dental department of the Detroit College of Medicine and Surgery has been secured for the sessions. Michigan has gen-

erously invited her sister States to share her hospitality and be her guests on this occasion. The programme contemplates four literary sessions, two half-days of clinics and one half-day of hurrah. This latter will come in the form of an excursion thirty-two miles up the Detroit River to the St. Clair Flats, where we will dine at one of the club-houses built on piles in the middle of Lake St. Clair. Special hotel and railroad rates are assured and will be announced later. The railroad fare will be at least as low as one and one-third fares. All reputable dentists in the three States are cordially invited to attend.

EXECUTIVE COMMITTEE.

UNION MEETING.

THE Second Union Meeting of the Washington City Dental Society and the Maryland State Dental Association will be held in Baltimore, April 17 and 18.

A cordial invitation is extended to members of the profession to be present. Special hotel rates will be secured.

W. W. DUNBORACCO,
Secretary.

1023 EDMONDSON AVENUE.

Selections.

SULPHURIC ACID FOR OPENING ROOT-CANALS.

To illustrate the method, let us suppose we have a superior molar tooth, from which the pulp tissue has been removed; the palatine root, being large, can be prepared by any method you may choose; place the solution in that portion of the cavity near the buccal roots and seal it in the tooth for twenty-four to forty-eight hours; then, upon the removal of the stopping, wash out the cavity with a dash of water from the syringe; upon drying the cavity you will find it white and clean, with two dark spots in the vicinity of the buccal roots, showing where the canals can be found. Now we try to enter the canal with the nerve-bristle: we find no opening. To

make sure we are not being deceived by a constriction, we take a bud drill and follow these stains a short distance; if we find no opening, or a very minute opening too small for the bristle, we will feel justified in saying they need no further treatment. But if with our exploring instrument we find a canal, we will carry the acid to the canal by dipping the instrument in the solution, or by means of the pliers, or, better still, the latest pattern of the Dunn syringe, place a drop of the agent in the chamber, and with a No. 5 Donaldson canal cleanser pump the acid into the canal; the acid will soften the walls of the canal sufficiently to allow the broach to cut its way into the root; the acid will also thoroughly sterilize the canal and everything in it. No germ or spore can live in the presence of H_2SO_4 in the strength employed,—twenty to fifty per cent. aqueous solution. The broach may scarcely enter the canal at first, but if you are persistent it will be but a few minutes till the instrument will go quite a distance into the canal until you reach the end of the root, where a much stronger resistance will be met with.

The thickened cementum at this point seeming to offer a greater resistance to the agents used, the canal can then be enlarged by using larger broaches, or if the root be straight the "Gates-Glidden" drill will follow the canal just made; it is more than likely that the apical foramen has not yet been opened; this can be accomplished, if desired, by drilling or by placing a small thread of cotton saturated with the acid solution in the end of the root and leaving it there over night, using the broach and acid at the next sitting; after one or two trials you can readily see how crooked or obstructed canals may be opened in a few minutes, and the canal will be in condition for immediate root-filling. It must be borne in mind that the rubber dam should always be in place before the operation is begun.—J. R. CALLAHAN, D.D.S.

THE International Dental Journal.

VOL. XVI.

MAY, 1895.

No. 5.

Original Communications.¹

DISEASES OF THE MAXILLARY SINUS.²

BY HARRISON ALLEN, M.D., PHILADELPHIA.

THERE is probably no subject in clinical medicine which has undergone greater change in the last few years than that of diseases of the maxillary sinus. Prior to the time when we obtained aid by reflected light in inspecting the nasal chambers, and to the use of the electric lamp in transillumination, the diseases of the sinus were not detected in their early stages.

The older writers said, for example, that one of the signs upon which physicians must depend for diagnosing pus in the sinus is a thinning of the anterior wall. This was said to be pushed forward and to crackle under pressure of the finger at the canine fossa. Another sign relied upon was the fulness over the sinus and general swelling from the eye downward; some, indeed, spoke of the elevation of the floor of the orbit; in a word, all the tests depended upon the supposition that the chamber itself was overdistended. Thus, Salter (Holme's "System of Surgery," 1864, vol. iv. p. 27) gives the local symptoms as follows: "The expansion of the whole jaw; the fossa beneath it full and prominent; the molar teeth on the affected side appear to elongate; the concavity of the hard

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the Academy of Stomatology, March 12, 1895.

palate becomes flat or even convex ; the nostril on the corresponding side is more or less closed ; in severe or protracted cases the floor of the orbit becomes so pushed up as to protrude the eye."

Erichson ("Science and Art of Surgery," American edition, p. 709) describes the cheek in "dropsy of the antrum" as being round and prominent and indolent, a semi-elastic tumor forming in it and protruding out of it and giving rise to the egg-shell or parchment crackling on pressure.

In Gross's "System of Surgery" the description both of the inflammation and suppuration of the maxillary sinus is denotive of graver conditions than I am aware are ordinarily met with ; at least, such states as those described by Gross are occasionally seen, but that they do not express the phase of diseased action met with in rhinological practice I am convinced.

In common with all other physicians who are interested in diseases of the nose and adjacent parts I have seen many cases of maxillary disease, and I may say in a single instance only were the signs enumerated above present. The older writers evidently had in view a distinct condition.

Speaking entirely from the results of my own experience, I would say that diseases of the maxillary sinus are of five kinds, mentioned herewith, in the order of their frequency : First, a secondary pus-formation dependent upon irritation at the root of a tooth. Second, a purulent inflammation seen in rheumatic subjects and not to be separated from exhibitions of rheumatism seen elsewhere in the economy. Third, extension of empyema of the frontal sinus into the maxillary sinus. Fourth, polypoid degeneration of the mucous lining of the sinus. Fifth, presence of sero-mucus formed under catarrhal excitement.

First.—Pus in the maxillary sinus when arising from irritation at the root of a tooth is the condition which associates this disease with dental practice in a conspicuous manner. It is important to remember that a very slight amount of pus will sooner or later tend to find its way into the nose, so that a purulent discharge in the nostril should immediately lead the observer to examine the teeth, and if any of the molar or bicuspid series be found defective, they should receive prompt attention. Extraction of the offending teeth will cure the purulent discharge in a very short time provided that no degenerate processes are set up in the mucous membrane or bone. It will sometimes happen that after teeth have been extracted and the pus collection entirely removed, relapses will occur. In such cases we have one of three conditions to study,—irritation

from imperfect absorption of the bone about the bottom of the old socket, imperfect healing of the wound created by extraction, or the presence of inspissated masses (the products of inflammation) in the chamber itself.

Second.—The results of dental irritation may be present in persons of a rheumatic diathesis. But inflammation of any kind, whether excited by disease about the root of a tooth or not, may extend rapidly into the sinus. Such cases are more apt to occur in middle life than at any other period, and I have reason to believe they are more common in those with history of alcoholic excess than in the temperate.

Rheumatic inflammation may occur on both sides of the face.

Third.—Disease of the frontal sinus if neglected is apt to extend into the maxillary sinus. In more than one instance after treatment of the frontal sinus the discharge into the nose continued, and I performed a second operation upon the maxillary sinus with result of demonstrating that empyema had existed in both the chambers. I have seen several cases in consultation where, after treatment of the frontal sinus empyema, the same condition was detected in the maxillary sinus.

Fourth.—The occurrence of a polypoid mass on the wall of the maxillary sinus may occur in the latter stage of any disease affecting this chamber; whether these growths are at any time the exciting causes of collections of pus is uncertain. This condition is perhaps the most inveterate of any to which the maxillary sinus is subject. Fortunately, it is rare.

Fifth.—In the last place we have occasionally present effusion occurring in the maxillary sinus. I have not seen this condition described, and it was unknown to me prior to my custom of using transillumination as an aid to diagnosis of disease in this portion of the body.

No case has come under my notice in which I could prove that inflammation of the maxillary sinus had extended from the nasal chamber. On anatomical grounds such an extension is readily explicable. I acknowledge that the difference between the two cases here detailed and those of inflammation of high grade is only one of degree.

I remember in this connection the case of a lady of middle age, who reported to me on account of deafness due to spastic inflammation of the middle ears. There was a large posterior hypertrophy of the inferior turbinated bone on the right side and ulceration on both sides of the triangular cartilage of the septum. The

disease continuing obstinate led me to make a careful inspection of the facial structure by transillumination; to my surprise, the entire right side of the face was much more opaque than the left. Pressure over the maxillary sinus above the gum on the right side yielded a dull pain which had not been complained of. The patient was of full habit and lithæmic. The opacity gradually disappeared by attention to general health and the use of alteratives.

In a second case, also of nasal disease (chronic nasal catarrh), in a lady in middle life, suspecting disease of the sinus, I made a careful examination by transillumination without result; some time afterwards, not being quite satisfied of the validity of the previous test, I repeated it, and found that the light did not pass through on the right side. In both these cases I concluded there was a fluid occupying the sinus preventing transillumination of light, which did not distend the chamber and which did not escape into the nose.

It is probable that the instances in which this effusion occurs are more numerous than we have supposed, owing to the fact that prominent symptoms are not created by the presence of the fluid. It would have been a mistake in my judgment to have opened the sinus in either of these cases.

Occasionally diseases of obscure character are located in the region of the maxillary sinus which do not readily admit of classification. A case of this character may be here outlined: a gentleman reported suffering from pain in the right side of the face in which I was unable to determine the cause. After a futile study the patient was etherized and the parts thoroughly explored. The sinus was opened in front at a point posterior to the canine fossa. Everything was found to be in a perfectly normal condition. Nevertheless, the patient rapidly recovered. Opening the sinus thus cured a pain which was centred in the region of the face.

Let me narrate a second case. Localized neuralgia of the nature of the *douloureux* was confined to the tissues upon the right side of the face in a married woman aged thirty. The parts were swollen, and the entire region of the cheek, including the malar bone, was unduly prominent. The pains were intermittent, attended with heat, flushing, and convulsive movements of the muscles of expression. The skin was at all times branny, shining with excess of sebaceous secretion, and of a redder color than that over the rest of the face. There was no discharge either into the nose or the throat; the molar teeth had been futilely extracted; the first bicuspid and the incisor were dead. The test of transillumination was negative. I etherized the patient and carefully explored the parts. The sinus

was opened and found to be apparently normal; the cheek tissues were dissected up as far as the lower part of the orbit, and the infraorbital nerve dissected from the point of escape from the infraorbital canal, and a portion measuring one centimetre in length excised. The sinus was opened on a line with the canine fossa and found to be empty. It was packed with iodoform gauze, and, greatly to my surprise, on the following day on removing these strips they were found to be saturated with pus. It was not possible that the pus could come formed from a perfectly normal sinus in so a short time, and I inferred that there had been pus somewhere in the sinus before operation,—probably in the posterior part, which is occasionally provided with a septum-like spur, and thus in part separated from the anterior part. The recess may have contained pus. The patient made a good recovery. There has been no return of the neuralgia, but the empyema has been a little tardy in disappearing. At this date, after a lapse of four months, the patient is entirely free from neuralgia and subject only to a very slight occasional purulent discharge from the sinus into the nose.

Syphilitic disease, of course, may be located in the maxillary sinus as well as in any other part of the economy. I simply mention the fact of the possibility of occurrence, since cases are occasionally detected. They require no special consideration.

All affections of the maxillary sinus appear to be much less frequent in the well-to-do than in the poor class of patients. Judging from my own experience, about eight per cent. of the crania obtained from dissecting-rooms exhibit evidences of inflammation of these parts. Physicians in charge of large dispensaries report that one or two cases of antral disease are generally found at any time on the list of applicants; yet dentists in large practices inform us that they almost never see diseases of the maxillary sinus. Certainly in rhinological practice they may be said to be not infrequent, and the affection should be thoroughly studied in all its phases by any one preparing himself to undertake this line of medical work.

SOME DISTURBANCES CAUSED BY DISEASES OF THE
TEETH.¹

BY EDGAR F. STEVENS, D.M.D., MEDFORD, MASS.

It is well known that few physicians, especially those who studied medicine twenty or more years ago, think of the teeth in connection with nervous disturbances of the body, the reason being that they have but a limited opportunity to learn anything connected with the teeth and oral cavity while in the medical school. But the time is coming when the student of medicine will have the same privilege of studying dental pathology that he now has of studying diseases of the eye, ear, throat, etc. Already one of our members holds the professorship of Dental Pathology in a Chicago Medical School, and I hope before long to see a graduate of our dental school lecturing on Dental Pathology to the medical student of Harvard. That the teeth are the cause of a great many disturbances not only of the parts contiguous to them, but often of parts far removed, is a fact which is recognized by us all, and it is not surprising when we bear in mind the intimate connection established between the teeth and other parts of the body by nerves, blood-vessels, and muscular tissue.

It is a wonder we have so little disturbance from some conditions. In the extraction of the teeth, for instance, the muscular and nerve fibres are broken, and the bony tissue split and slivered, yet, as a rule, how little attention or medication is needed. If an injury to any other part of the body were as extensive, it would produce a much greater amount of distress. We have all seen patients with high pulse and temperature, and in an extremely nervous condition caused by alveolar abscess. We are all familiar with the different phases of neuralgia caused by deposits of salivary calculus, exposure of pulp, calcification of pulp, pressure of gas, pressure of fillings on pulps, extended eruption, spicula or nodules of bone which have not been absorbed after extraction, and by many other causes. Under some circumstances the teeth and reproductive organs in females are in sympathetic discord; and cases are not wanting to prove that the dentist is capable of alleviating the distracting pains when the general practitioner is at a loss as to cause and treatment.

¹ Read before the Harvard Odontological Society, Boston, September 27, 1894.

I shall present to you to-night the record of a few cases of disturbances caused by dental irritation, which have come into my hands.

The first case is that of a lady about thirty years of age, who had supraorbital neuralgia. The pain would start a day or two before the menstrual flow in a second superior right molar, and shoot to the supraorbital region. It was intense, sharp, gnawing in character, and would generally last until the second day of the flow, when it would gradually pass away. She had been under treatment for neuralgia, but relief was only temporary. Through one of my patients she was induced to come to me for examination. The tooth in question looked all right, no cavities, no discoloration, not tender to touch, but from the nature of the pain which, as I said before, was of a sharp, gnawing character, I concluded that the pulp was calcified. I removed a large coronomesial filling, which was in perfect condition, and cut down to the pulp-chamber without giving much pain, and found the body of the pulp entirely calcified, filling the entire chamber, but not attached to its walls. The root-canals were imperfectly filled with calcified tissue a third of their length. Touching the living pulp in the lower part of the canals would send a sharp pain to the supraorbital region. The patient remarked that "it was like taking a shock of electricity." The pulp-tissue was devitalized and removed, the canals filled, and the crown filling replaced. The neuralgia disappeared.

The second case is that of a lady pregnant for the first time, who, two weeks before the expected birth, suffered greatly from pain which started in an inferior molar, and was transferred to the uterus, then back to the tooth, and thus it continued changing from two o'clock in the morning till her physician arrived at eight o'clock, when he examined thoroughly and was positive the pains were not caused by the contraction of the uterus, and after giving an opiate called on me and asked if I thought the tooth had anything to do with the pain. I replied it was not improbable, and that the patient had better come to my office if she were able to do so. Upon her arrival I examined the mouth thoroughly. Her teeth were in an excellent condition, with the exception of the tooth in which the pain started. This tooth had large approximal alloy fillings, which were apparently doing good service, but the tooth was discolored and a trifle tender to the touch. Being satisfied the tooth had either a dead or a dying pulp, I opened into the pulp-chamber and found the pulp dead. I washed out the canals with peroxide of hydrogen, and applied a capsicum plaster to the gum,

placing a pledget of cotton loosely in the cavity to keep out food.

The patient, who had been crying with the pain, which seemed to be intense in the uterus, but not very much so in the tooth, dried her eyes and said she was relieved. She had no recurrence of pain, and at the proper time gave birth to a healthy child. The tooth was afterwards treated and filled.

The third case is that of a man whom I found waiting in a carriage in front of my office one morning holding on to his head and acting very peculiarly. He followed me into the office and cried out in agony, "Doctor do something quickly for me, I am nearly crazy; it seems as if my head would split." I asked him if he hadn't better see a physician. He replied that he had seen one, and had been sent by him to me. I found by questioning him that the pain had started about a week previously in a second superior molar, and had not been very severe until the night before I saw him, when it began to "sing," as he termed it, and his whole head was in an intense neuralgic condition. I found a large alloy filling in the masticating surface, which I removed. The pulp-chamber was filled with red gutta-percha, also the entrances to the canals. With a stiff broach I found I could push through the gutta-percha in the buccal canals and touch nerve-tissue. The palatine canal was filled to the apex with the gutta-percha. I removed all the gutta-percha from the canals, and tried to obtund the pulp with cocaine (ten-per-cent. solution), but to no purpose, and decided as pain was so severe to etherize the patient and make short work of it. After etherizing and breaking up connection with a barbed broach the patient regained consciousness, and smilingly said the pain was entirely gone. At a subsequent day the canals were treated and filled.

The fourth case is that of a boy, eight years of age, who while riding on the rear platform of an electric car was struck by the brake-handle. In turning the corner the trolley slipped off the wire, the rope which is attached at one end to the trolley pole was, as is usual, fastened at the other end to the brake-handle, which was thrown round with such force that it struck the boy on the side of the lower jaw and knocked him against the door, bruising his shoulder quite badly. Five days after this occurred his physician brought him to me for examination. I found upon opening his mouth that the second inferior left deciduous molar had been recently removed (it was knocked out by the brake-handle), the first deciduous molar was displaced, the masticating surface presenting

to the tongue, the roots projecting through the gum externally. There was also an incomplete fracture of the outer alveolar plate extending from the inferior canine to the sixth-year molar; a severe contusion of the left cheek and laceration of the mucous membrane, with a discharge of pus internally from a lacerated opening in the cheek. The roots of the displaced molar projected into the wound in the cheek, and I extracted it; I also washed out the abscess in the cheek with a solution of carbolic acid, directing the patient to use listerine as a wash. I saw the boy on the third day after this, and decided to open the abscess on the outside of the cheek, the swelling being half as large as an egg. About a teaspoonful of pus was evacuated. The parts healed nicely, the scar being barely perceptible. No doubt in this case the cause of abscess was infection from the roots of the deciduous molar, which was in a state of chronic abscess, the roots being forced into the cheek when struck by the brake-handle.

The fifth case is that of a lady who, four days after having some teeth filled by her dentist, noticed her face on the left side commence to twitch and draw up. In three days from this time she was unable to open her mouth on account of the rigidity of the muscles. Her physician, becoming alarmed, called one of the surgeons of the Massachusetts General Hospital in consultation, who evidently thought she might have tetanus, and stated that she would be a great deal better or a great deal worse by the seventh day. The critical time came, and she was no better and no worse.

At the suggestion of the consulting surgeon that possibly the teeth that were filled might be the cause of the trouble, I was called in to examine. The patient was in bed, and although I knew her by sight I should not have recognized her, her face was so distorted. With a small glass I was able to press out the cheek and make only an examination of the buccal surfaces of the teeth; but as the wisdom-tooth, which was rather small, had an extremely large alloy filling in it, I concluded that the pulp-chamber must have been encroached upon when the cavity was excavated, and, furthermore, the patient had felt but little pain when the tooth was filled. I concluded that the pulp was dead or dying, and advised its being removed. The patient was etherized, and although two hundred and fifty grammes of ether were used, and reflex action seemed to be interfered with, as evidenced by stertorous breathing and loss of sensitiveness of the eye to light or touch, we were unable to overcome the contraction of the muscles of the lower jaw, and it was impossible to open the mouth more than a quarter of an inch. I managed to slip the beak of the forceps into the inside edge of the

tooth, and, using the lower tooth for a fulcrum, pried it out of its socket. On removing the filling I found it had been anchored into the pulp-chamber. The remains of the pulp were in a putrescent condition. The patient gradually recovered the use of her jaw, although it was quite stiff for over a year.

The sixth and last case was that of a lady who had been under the physician's care for a number of months for mania. She would have periods of crying, then suddenly jump up and down and yell at the top of her voice. She had lost weight, her digestion was impaired, and she was apparently in consumption. Her teeth being troublesome, her physician requested their removal. Ether was administered, and all her teeth, which were in a terribly broken-down condition, were removed. Inside of two weeks she had recovered her mind, and is now at the end of four months in a good physiological condition.

In closing, I wish to say that I believe we should impress upon the minds of all our medical friends the fact that the intelligent dentist should by right of special education be consulted by them whenever disturbances of the nervous system do not readily yield to general treatment, thereby not only benefiting in many cases their patients, but cementing more closely the relationship between medicine and dentistry.

SPECIALISM.¹

BY REV. NATHAN E. WOOD, D.D., BOSTON.

MR. PRESIDENT AND GENTLEMEN,—I once had a deacon, a good man, who not a little amused his pastor by explaining in a conference meeting how greatly he enjoyed the pastor's preaching. He sat in his pew Sunday after Sunday, he said, and the pastor's sermons made the cold shivers run up and down his back. You will see at once that there is wide room for conjecture as to just what was his meaning. "Cold shivers up and down the back" would not at first thought seem to be an altogether pleasant Sunday recreation, yet the deacon seemed to enjoy it. His remark had such openness, and offered such scope for the imagination, that it was

¹ Read before the American Academy of Dental Science, November 14, 1894.

really delicious, and is a cherished recollection to that pastor even to this day.

I am proud to confess to you that dentists have given me a similar sensation more than once. Indeed, there are few persons whom I have known who have so great ability as dentists in making the shivers run up and down one's back; and they always have such an easy way of paralyzing one's vocabulary on those occasions that one can neither "talk back" nor describe one's feelings. It will be an easy sum in arithmetic to work,—viz., if one dentist can so affect me, what must be my feeling to be face to face with forty?

The times in which we live and are actors are peculiar, and in that respect are like all other times in which men have lived. A generation of animal life in the air, in the sea, or on the land may come and go and be differentiated in no way from what precedes or what follows. The characteristics, so far as science can discover, may be undeviatingly alike. But no generation of men has been characteristically like any other. Each generation leaves its own diverse record of character, deeds, and results, and each age differs from every other in the long procession of human history. Our age characteristics are clearly enough defined. They need sober study and understanding by every man who desires to live efficiently. One ought to know the general drift of things around him, and somewhat also of the minor currents and eddies. Doubtless some men will live efficiently without having any very clear knowledge of their own times. But I fancy that even such men distinguish, by means of an indefinite mental sensitiveness, something of what is passing about them. They guide themselves instinctively by this undefined, unclassified, and I might almost say clandestine information which is thus filtered in upon them by a kindly providence. Nature always seems especially forbearing and tender towards the improvident; nevertheless, clear-sightedness and provident effort are more certain to furnish a coat to one's back as well as guiding to a true life. This century, which is now almost closed, will be labelled among all the centuries as the wealth-getter. In this particular it stands pre-eminent and unrivalled. Its energies have been turned first of all to the exploration and the mapping out of the hitherto unknown areas of the earth's surface. In this direction there is very little more possible of accomplishment. A few more ice-fields, icebergs, and barren coasts remain yet to be compassed. There are a few more polar bears whose acquaintance

has not yet been made, and a few more Esquimaux to be brought into the camp of those who are curious about such matters. But practically, the earth's surface is now known. The century has bent itself also with almost superhuman energy to the mastering of material resources. Almost all the development and discoveries of the modern sciences have been made to contribute towards the increase of wealth. The problems of wealth have absorbed the thought of the age. The world has never before known such an era of invention; but invention has been transmuted always into terms of material gain.

The relations of peoples and nations to each other are finally adjusted upon terms of commercial advantage. The cabinets of the world study the tables of interest, rates of discount, and the profits of investments, and then decide upon what is best to be done or not to be done. Statesmanship stands behind a pair of gold scales, and a pennyweight decides the fate of nations. The steamship and the railway-train are the foci upon which the ellipse of the century is circumscribed. All life seems to be drawn to the scale of good bargains and rapid accumulations of property. Even the problems of society and the social order are studied almost wholly with a view either to profit and loss or to the amelioration of physical conditions. Materialism is lord of the hour. The enormous increase of wealth has opened the problem of its equitable distribution. Socialistic theories innumerable are in the air with downy wings, like thistle seeds, ready to alight and grow in any open piece of soil. These two problems have overshadowed all others in our age,—viz., how to increase wealth, and how to maintain an equal distribution. The conspicuous name of the one is commerce, and of the other, is Socialism; but both of them have to do almost exclusively with the material side of life.

I do not forget the mighty intellectual achievements of our century, nor the repeated conquests at home and abroad of the Christian religion. I do not forget the extraordinary enfranchisement of some of the down-trodden classes of society. Nevertheless, it seems to me that the words which most completely summarize, and therefore will label the century in history, are "wealth-getting."

A curious illustration of this overmastering passion for materialism is shown in the history of the doctrine of modern evolution. It began its work with physical organisms. Its investigations were in the unfoldings of physical life. Its steps were from protozoa to the body of man. It has eagerly thrust its researches into almost every phase of material organisms. It has been immensely

active in study of the earth's crust and history, and of organic material forms. But it has only just fairly awaked to the study of the higher life in man. It has seemed almost as if evolution recognized no higher life than the concourse of physical atoms called the human body. It seemed bent on dethroning both heart and intellect in man, or rather, perhaps, of wholly ignoring their existence. Indeed, whichever way one looks to watch the intenser activities of our time, one sees that the main convergence of them is upon material things.

Political economy is one of our newer and rapidly-developing sciences. It is peculiarly popular. It would seem that it ought to be broad enough to cover the whole body politic, the complete "politeia," but one finds that it concerns itself, even on the sociological side, chiefly with wealth. The laws, the protection, the increase and the distribution of wealth are the chapters of its study. The State would appear to exist as an organized system only for the protection of property. Legislation is chiefly concerned about property. Under our beneficent system, a man steals a handkerchief from your overcoat pocket, or a loaf of bread from a baker's cart, and he is straightway thrust into prison. He debauches body and soul by whiskey sold over a counter, or by foul literature in clandestine print or upon the "bill boards;" he appeals to the most debasing passions, and cultivates the ruin of that which is noblest in us, and the State rises up with all its legal and police majesty to protect him. We make him an alderman, or justice of the peace, or Congressman. The goddess of liberty comes down from the dome of the State House and holds her ægis before him, so that virtue, morality, and religion may be unable to smite and manacle him. Faneuil Halls ring with speeches about personal liberty and a bill of rights. In a word, touch property, and a prison yawns to receive you. Lay hands on the noblest thing which is in man and drag it down to destruction, and your reward is the applause and the votes of your fellow-citizens. If a fire starts in a warehouse in Boston, the whole fire department will turn out and work unweariedly to put out the blaze. The city is absorbed with interest in checking the conflagration. Saloons, gambling dens, bawdy houses, presses reeking with impure literature, haunts of crime, shameless indecency upon bill-boards, traffic in the bodies and souls of the young, poison the atmosphere so that virtue and character wither and die. The foul contagion strikes members of households here and there over the whole city, and yet the city sleeps quietly and in peace.

Is it not a fair inference to say that the age regards wealth as a more valuable product than life? This overwhelming prepossession in favor of property has developed another strange condition, which, perhaps, I can bring before you by illustration better than by abstract statement. The factory has grown to its present great proportions around the idea of the division of labor. In a wagon-factory you may see one man who does nothing for ten long hours every day but take spokes from a pile and hold them under a trip-hammer, which at a single stroke drives them into the hub. Another man guides the machinery chisel which makes mortices in the felloes; and another, a painter, does nothing except stripe the side boards of lumber-wagons. So through all the endless subdivisions of labor you will see men engaged in the minutest kinds of tasks. If factories are to go much farther along this line, microscopes will be needed by every artisan so that he may be able to find his own special work. The tendency of modern wealth-getting has been so rapid towards the minutest subdivision of toil that we have scarcely as yet had time to realize the effect on society at large. Labor becomes more skilled when directed within narrow limits. Articles of manufacture can be produced more cheaply and the profit of sale be made larger by this method. More perfect work is done, and our material comforts are largely increased. There can be no question but that this tendency has added greatly to the increment of wealth. Combinations of capital and subdivisions of labor are the two hands which have builded the temple of modern commercial prosperity. The economist points triumphantly to this result, and all his theories seem justified. And he is justified, if wealth-getting is all that there is in life worth living for. His conclusions are true, if the chief end of man is the hoarding of material gains. But the preacher may be pardoned, if he insistently inquires what will be the result of all this upon a man's higher life? What must be the effect upon the man himself, of these narrowed tasks upon which he is compelled to spend his time and strength? What mental habit will be begotten? What range of outlook will become fixed? Will he become near-sighted or far-sighted in regard to the great facts and truths of the higher life? Must the necessities of wealth-getting be so constraining of his attention that he will think of nothing but the work of his hands? Specialism in manual labor is good, doubtless, in so far as increase of wealth is concerned. But the artisan's mental horizon will become adjusted finally to the very small area of his own special task. Heaven becomes a mill where the machinery goes without a hitch,

and hell a mill where the machinery is all awry. Thought is limited in scope to a wheel-spoke, or the polishing of a pin-head, or the filing of an amalgam. Life is bounded by the six walls of a shop or a store, and conscience becomes only a response automatically to the approval or disapproval of an overseer. The highest good to be reached is to become the most skilful possible machine for the production of the most perfect possible material product.

The two powerful tendencies of modern times are clearly against the development, the enrichment, and the ennoblement of what are to me the great elements in human life. Political economy, on the one hand, urges subdivision of labor as the true road to increase of wealth, and specialism in toil as a supreme law. This tends to make of men merely skilful machines. It treats them as material beings. Socialism, on the other hand, preaches the solidarity of the race in such a theory as destroys individualism. The individual is nothing. The social order is everything. The levelling of individuals is to proceed until uniformity of human beings shall take the place of diversity, and the dead level of a society robbed of its loftiest elements is reached. Between these millstones of wealth-getting and socialism men are to be crushed, if it is possible to crush them. They will destroy what is nobly characteristic and best in the individual human units which compose society. Both of them look at life as if it were only physical, and as if a material well-being wholly measured what are really measureless heights, depths, and areas of a man's life.

Gentlemen, a man's life ought to be larger than any work which he does. Work and life ought not to be commensurate terms on any true theory of life. My protest against specialism in labor is that it seeks to reduce work and life to the same terms, levels, and measurements. It is idle to complain of the meagreness and narrowness of the lives of workingmen, so long as society crowds them down into the narrow compass of their specialty and bids them live there. Health of the larger sort does not flourish under ground. Is it a compliment or not when you meet any man who has a specialized task and instinctively begin to converse with him upon topics which belong to his own work alone? Do you not in effect imply that the man knows nothing except in his own line of work? His life is shut up within his shop. I will talk to him of what he understands. His knowledge and measurements of life are shop-marked, and therefore I will confine myself to ideas which are shop-marked. You talk down to his comprehension. You pass over the counter of exchange of ideas only such coin of con-

versation as has his shop-stamp upon it, and has been specially minted for his narrow and poverty-stricken use. The same grave charge lies against professional work in almost all its departments. One dentist no longer attempts to cover the whole range of dental science. One man extracts teeth, another makes them; one man fills cavities, another prepares plates. Indeed, the subdivisions of labor have already grown very numerous. Doubtless dentistry profits by this method. Better work is done. Greater profits are gained. Scientific treatment is assured. The physical comfort of mankind is increased. Probably the increment of wealth perceptibly enlarges. But the interrogation point still calls for an answer to the question, What is the effect on the dentist himself of this continued narrowing of his calling? Is it to be followed by a narrowing range of mental and spiritual vision? Is the horizon of a doctor of dental surgery to be made coterminous with a dental cavity? Is life to have only the boundaries of the alveolar process, or to be merely a series of alveolations? These seem very simple questions, but they need very sober answers. Specialism in medicine has proceeded so far as to raise the question what we who are practised upon are to do. We are sick. We send for a physician. He is a specialist in gout. He discovers no gout about us, and therefore can do nothing for us. We send in haste for another physician. He is familiar with colic only. He finds no trace of colic in us, and is powerless to help us. Another physician comes and examines us for symptoms of jaundice, but finds the skin clear and liver active. Another comes and pokes our jaws to discover signs of mumps. He knows only mumps. At last one comes who recognizes that we have a fever. Ah, what endless possibilities in medical science does a fever open! But who can tell us what produced the fever? Heaven help us, else we may perish before the right specialist is hit upon to give us relief! Fortunate, indeed, shall we be if we can diagnose our own ailments so as to call the required specialist in time! Where is specialism to end? Is the whole mental attitude and poise of a professional man to become adjusted to his own special calling? The highest truths and the noblest interests of mankind have never yet been measured by the tape-measure of a profession or weighed in the scales of a specialist. The scalpel has not yet uncovered a thought, nor dissected a soul. The whole trend of specialism for which our century has become so justly famous is towards a narrowing measurement of life, and towards a microscopic study of human relations and destiny. The microscope has been and is a valuable servant. It has opened a

marvellous realm of knowledge, and has become the beneficent auxiliary of science. It has become the close and powerful ally of all those professions which minister to the physical life of man. But the microscope will never enable a man to see the stars, and you have left off from life its dome and its climax if you do not see the stars. Professional work is of necessity largely microscopic work, and the mental chapters in the autobiography of a professional man are too often only the consecutive chapters in a work on microscopy. It is our modern method which is largely responsible for this unnatural rivalry between a man's professional work and a man's greater life. They ought to be in loving wedlock. Each ought to minister to the enrichment and ennoblement of the other. But alas! too frequently they are declared enemies, and the profession vanquishes the life and is all unconscious of what a gruesome victory it has won. A profession is, after all, only the coat which we are compelled to wear for the sake of temporary comfort and conventional decency. It will become threadbare and be flung away after a while. Is not the great Teacher's query always pertinent, "Is not the life more than meat, and the body than raiment?" What is the chief end of man? The modern catechism answers very promptly, "To gain a livelihood and hold on to it as long as possible." I take the old catechism by preference. I like its answer better,—*"To glorify God and to enjoy Him forever."* But successful specialism is fascinating, and withal, it must be confessed, useful. Moreover, it is an exceedingly jealous master, and insists that a man shall give to it all that he has. The tremendous competitions of modern life emphasize this demand. The beguilements both of fame and of property-getting are always about us. It is not strange that most men should finally succumb to so great allurements. The idols of wealth are niched in every street and in every market-place. We are always getting upon our knees, with hats off, before this shrine to worship, and oftener than not our knees are in the mud. Yet, after all, the most of wealth is only mud, coined and put in circulation. The mental habits of specialism are in utmost danger not only of a contractile narrowness, but also of a gross and absorbing materialism. They will transmute nobler things into their own forms. Emerson says "that Lord Coke, 'the great English jurist,' valued Chaucer highly because the Canon Teman's Tale illustrated the statute fifth, Henry IV., chapter fourth, against alchemy, and that the physician Sanctorius spent his life in a pair of scales, weighing his food." Now, all this is good professionalism, but bad life.

The higher education is tending to fall into the same drift. Courses of study are made elective, and young men make their choices along the line of a future calling. The Humanities, which broaden and fructify the mental life; Ethics, which would make the moral life virile and the conscience sagacious; Religion, which would open the windows of the soul Godward and manward; all these are passed by, and what are called practical studies (heaven save the mark!) are pursued with a perverted avidity. They are the bread-and-butter studies. The majority of men would greatly prefer to starve their minds rather than their bodies. Give us, they cry, a good steaming dinner in eight courses every day in the year, and plenty of other meals to match it. But "not a wave of trouble rolls across their peaceful breast" if they haven't had a new idea, or read a new book, or had a solitary stir of intellectual and spiritual life towards the noblest things in a twelvemonth. An expanding paunch and a contracting brain are the monstrous twins to which modern materialism has given birth. You will rightly guess that my protest is not against a thorough knowledge of one's specialty. Mastery of details as to chemical constituents, climatic conditions, suitable fertilizers, judicious crops, and thorough subsoiling of one's professional acre, every man ought to have; but let him not suppose that his acre is the earth. Life was meant to be drawn to the scale of the universe and not to the scale of an acre, even though that acre will produce for him cabbage and bread. I believe with Lowell when he says, "I had rather the college should turn out one of Aristotle's four-square men capable of holding his own in whatever field he may be cast than a score of lopsided ones developed abnormally in one direction." The danger from professional specialism is that just such "lopsided men developed abnormally" will result. A great dentist is admirable, but if he is produced at the expense of a great life, he is pitiful. I have only time to call your attention to this serious subject. Modern specialism necessitates most intense rivalries and conflicts in a man's own life. Unhappily, to most of us there is no conflict, because we quickly succumb to our profession, and its lordship over our lives becomes undisputed. But if a man will live a great, noble, growing, true life, he will find himself in the fiercest sort of a conflict. He must with hourly insistence cultivate the mental and spiritual habits of the larger view of life, of the wider horizon of thought, and of the eternal heights and depths of a soul. The encroachments of specialism upon a man's temper and range of thinking are so dangerous, the contractile power is so great, the temptations

are so alluring and destroying, that every man should be open-eyed to see and avoid the danger. The habit of wide and varied reading in diverse sections of general literature; the curiosity of the scientific mind carried into many fields of research; the devout spirit bending itself with profound thoughtfulness over the facts and problems of religion; the set purpose always standing out in the clear of our vision to live a life that shall be wide and deep and high; and the plain acknowledgment without reservations that life is not to be ephemeral, but is to be interwoven with the life of God; all these in us will hold life in its higher levels, and faithful to its true goals. Goethe makes the world-spirit say to Faust, "Du gleichst dem Geist den du begreifst" ("Thou art like the spirit which thou dost understand").

Gentlemen, and I do not forget that the best dentists are always *gentle-men*, may your success in your chosen calling be great, but may that success be only a segment of the larger areas of your lives!

DENTAL FURNACES.¹

BY DR. W. M. SHARP, BINGHAMPTON, N. Y.

GENTLEMEN,—The subject of my paper this evening is a matter which ought to concern every practitioner of dentistry. It is safe, however, to state that a very small percentage are acquainted either in the construction of a furnace or its use.

If one should go on a tour of inspection through the dental offices of to-day, he would find a large number equipped in the manner I will attempt to describe.

In our profession we have classified our operations, and have named the one prosthetic, the other operative, the operations being equally important; and in our offices we have prepared rooms for each of these.

In the operating-room will be found either an oiled floor, or a beautifully carpeted room, pretty curtains, rugs, handsome furniture, the most modern operating-chair, all the electrical appliances, a dental cabinet that has within it an assortment almost equal to a dental depot,—innumerable instruments, excavators, elevators,

¹ Read before the Odontological Society of Pennsylvania, December 8, 1894.

illuminators, generators, and regulators; rubber-dam clamps for the proximal, distal, labial, lingual, and cervical portion of every tooth. Theoretically these are all perfect and necessary; practically a much smaller and well-selected assortment of instruments would meet all requirements. In such an operating-room there is no indication of superior mechanical ability; there is evidence that some one else has done the originating, and it only remains for the operator to study their application. In fact, everything of comfort and convenience may be found in this room to facilitate the success of the operation.

The mechanical room presents an entirely different aspect. Any room in the building is considered good enough for this purpose. A back room where there is but little light will answer. White walls, bare windows, cold, no carpet. In one part of the room there is a lathe, in another a plaster-cast, some plaster in it and a good deal on the floor, a bench or table covered with wax, impression-trays, scrapers, and old broken plaster models. On a table or in one corner there is standing on guard a vulcanizer. It looks well in this room, is strong, and would be stronger if it did not leak steam. With the exception of a few dishes and bottles, this is pretty nearly all that will be found. There is nothing inviting in the room; there is no interest; how could there be under such circumstances? In the office the very instruments of the operating-room have the look of superiority over those of the mechanical, while the mechanical instruments have the look of insignificance and have not the power to assert their importance; they are deficient in numbers and inferior in quality. Certainly there is a marked contrast of the one over that of the other. What has occasioned this lack of interest in this branch? for it was never intended that any part of our profession should be neglected, but there should be perfect harmony and an increased interest in all operations.

A little investigation and the cause is easily traced. Unfortunately some people have a most contemptible element in their nature. It is this feeling of superiority over his fellow, and a belittling of others and their vocations, where self-esteem knows no bound. In our profession we have a few of these people. They would have their patients understand that there is a vast difference in the operations of dentistry; that the care of natural teeth requires greater skill than does the mechanical operations. There are so many objectionable duties connected with that branch, and he prefers to let some one else do it, while he is entirely an opera-

tive dentist; he is working to give his patient the impression that he is in advance of the ordinary dentist. There are a good many operators of this class who have this feeling towards mechanical dentistry.

Certainly there are exceptions. Some have taken it up as a specialty; there can be no point raised against any man for making a specialty of any part of the profession; but when this is done, it never occurs to him to feel himself above other members no matter what success he may have in it.

There can be no doubt but this existing feeling has to a considerable extent interfered with the interests that would otherwise have been in this branch.

The principle reason, however, I think is due to thoughtlessness on the part of the dentist in not having more pleasant surroundings, more of the comforts and conveniences in this room. If one is a mechanic, which he must be to successfully practise this profession, he will feel more at home in this work than at operating. If any man should feel himself superior to another, the mechanical man has far more reasons for doing so. One single successful operation of an artificial palate gives a dentist a standing that could not be reached in operative dentistry. The same may be said of an artificial nose, artificial ears, artificial teeth. The smallest fee charged for a mechanical operation is far in advance of the smallest in operative dentistry.

As regards the unpleasant duties in mechanical dentistry, there are none. If they refer to a little plaster of Paris on one's fingers occasionally, I can only reply, I would rather have my hands covered with plaster in connection with a case for which I was to receive one hundred dollars than I would to work over a nervous patient at the chair, the equivalent of time, on the treatment of putrescent pulps, and for which I would not receive more than one-fifth this amount.

Now, let us all elevate mechanical dentistry and attempt more difficult operations. There is a wide field for investigation and improvement in methods and appliances and possibilities for greater attainments. Once interested there is no greater fascination.

My idea of a laboratory is a room which is conveniently located, pleasant, properly lighted and ventilated, and windows trimmed, not necessarily with expensive material, comfortable chairs, carpet on the floor. I use Scotch cork carpet: this is noiseless and can be mopped, and adds much to the room. For furniture, this may be largely in the shape of cabinets for instruments and tables of

operations. Don't buy cheap things ; get something you like and you will always have an interest in it.

Be careful in your selection of instruments and appliances when you get them. No man can make a proper selection of instruments if he is not first familiar with the operation he is to perform ; if he is, it takes but little explanation of the working of any apparatus for him to decide promptly whether or not it will be valuable in assisting him in his operations. If you think an instrument will be valuable, procure it ; if you think it will not be valuable, do not get it because the dealer or agent says some popular dentist has one. It may be that his idea of instruments and yours differ. What would be successful in his hands might prove detrimental in yours ; and because your results were not equal to his you would in all probability charge your failures to the apparatus, never stopping to consider the fault is with yourself. In the first place, perhaps your knowledge on this subject is not quite as good, and that in trying to manage something that you are not satisfied with you lose interest. Fortunately we have a variety of appliances for making our artificial substitutes differently constructed but reaching the same end, which gives us a chance to choose that which is best adapted to meet the requirements.

Now, with care one may have his laboratory fitted out with appliances that are constantly in use. We will assume he has made a good selection of everything except a furnace. He will need something by which he can quickly and conveniently melt his zinc, lead, or to refine metals, to prepare his cases for soldering, to make a porcelain crown which he has carved for some special case, to make an aluminum plate, to make a porcelain bridge, or for the repair of porcelain, or to bake the teeth which he has carved for special cases, and to make continuous-gum teeth. For each of these operations he will require heat. Since in our variety of dental furnaces there is made a separate one for each of the above cases, it might be thought necessary by the inexperienced to purchase one of each kind so that he would be fully equipped. In my judgment I do not think this necessary.

The most desirable is that which is so constructed that it will make laboratory work light and convenient, and will give opportunities for the greatest range of uses in the shortest possible time.

The most desirable fuel will be that which is most prompt in action, the least objectionable to work with, and which is controlled without fear of endangering one's self in its use, since the results will be the same when the desired temperature is reached.

The success of the operation will therefore depend upon the construction of the furnace, together with the manner in which it is operated, with little reference to the combustible used. In this direction I recommend your investigation in selecting your furnace.

The study of combustion will settle this question for you and fit you to scrutinize to your entire satisfaction the most complicated furnace.

Except for use in connection with porcelain work, there is practically no need of inquiring into detailed construction, for it matters not whether they have been built with a view to having perfect combustion or not, if only the temperature can be reached and they are otherwise satisfactory.

Porcelain is highly sensitive to certain gases and to foreign matter, so that there is provided a chamber or muffle which protects it from the direct influences of the fuel used. Cases injured from this cause are termed gased.

Let us consider the furnace which has been in use the longest time and is in some respects the best. It is the large coal furnace which is in every college building and with which you are familiar. In the centre of this is a large space for coal, with a clay muffle stretching across from one side to the other. The great amount of coal or coke surrounding the muffle furnishes a steady volume of heat which is necessary to get the best results in porcelain work. No better work has ever been done than that made in this style of furnace when the management has been good. But the inexperienced will gas his work every time, until he learns that he must attend to the draughts and get his fire in proper shape before he commences his baking. If one is doing a great amount of this work, sufficient to keep it running a full day at a time, and has plenty of room to keep it in and is indifferent to the temperature of his room while working, this will do the work perfectly.

For me to go into detail on the construction of the different furnaces now in use for this purpose, it would seem unnecessary, since I have made a careful study of the underlying principles and have endeavored to present them as they appear to me, and since I have brought with me a furnace of my own construction which will convey to you my ideas on this subject better than I could otherwise present them.

CARVING OF BLOCK-TEETH.¹

BY F. A. CONEY, D.D.S., DOYLESTOWN, PA.

HAND-CARVED blocks have the merit of being the most natural-looking and at the same time, when well mounted, the strongest artificial teeth made. When the best results are desired, and neither time nor cost are objects, carved blocks are the best recourse of the dentist.

It is here that the carver has an opportunity to carry out his conception of a very difficult and peculiar case. The teeth can be placed in any position or inclined at any angle deemed desirable. The natural expression of a carved block is seen in the bolder curves and contours made by the skilful hand, which it is impossible to produce from brass moulds.

The following is a description, in detail, of the carving process in general use from about the year 1850 to date:

The first step is to get a perfect impression, and a bite for an upper or lower, whichever space the piece is intended for. The simplest and shortest method of getting a bite for small partial cases is the following:

Take a roll of beeswax—or modelling composition, which I prefer—from one to two inches long, according to the number of missing teeth, and about three-fourths of an inch thick. Soften in hot water, bend into a semicircle, and press it against the teeth on each side of the space or spaces requiring substitutes. Then direct the patient to bite through the wax until the cutting-edge and cusps touch and occlude naturally. After pressing the wax or modelling composition against the labial or buccal surfaces of the teeth, carefully remove it from the mouth, and harden it in cold water.

Now, then, take water and plaster and mix it quite thin. First fill the imprints of the teeth in the wax or modelling composition, and work the plaster into said imprints. As the plaster stiffens build it up and extend it back over the palatine surface, and about one-half or two inches beyond said impression. That will give the upper part of the model. Trim it to the desired shape to handle conveniently. Now sandarach or shellac the plaster exposed to view, then oil the model and bite with sweet oil. The next step is

¹ Read before the Odontological Society of Pennsylvania, December 8, 1894.

to run the lower part of the model with plaster. When plaster is set, put said model in hot water to soften the wax or modelling composition.

When soft take it apart, and you have the model of the mouth to carve your block by.

The next step is to enlarge the cast. If it is to be a block of two teeth, cut from the approximate surface of each tooth of both sides of space to be filled about one-half of a sixteenth of an inch. This will give the shrinkage for said block.

For a block of four teeth you proceed in the same manner as for a block of two teeth, with the exception that you take from the approximate surfaces one-sixteenth of an inch from each tooth, thus allowing a greater shrinkage for a block of four teeth than for a block of two teeth.

For a block of six teeth, you proceed in the same manner as you did for the block of two or four teeth, allowing, of course, for a greater shrinkage, according to the case you have in hand.

Now prepare in a small tin cup spermaceti, melting over a spirit lamp until it becomes liquid. Add enough Chinese or red vermilion to color it to a cherry red. Then take the liquid spermaceti and paint with a camel's-hair brush your impression model, the space between the canines. If it is to be a block of four, also paint the canines. For a block of six do the same as for a block of four, in the same manner for all models which are used for carving of teeth.

Apply with a camel's-hair brush sweet oil over the antagonizing model or bite, so the bite will separate from the body without drawing it.

I use Lukens's body, prepared by S. S. White. It is the strongest body known, and fuses at the highest heat. This body I mix in a porcelain bowl or wedge-wood mortar by adding water to it to make it the consistency of putty. It is now ready to be packed or worked into the model. When the model is full of body, dry out the body on a muslin cloth so as to absorb the moisture which arises on the surface; it also makes the body more solid and firm. It is then ready to begin carving.

The carving instruments are known as a string-bow, carving-knives of different shapes, one bone spatula, pin tweezers, and camel's-hair pencils.

Before commencing this process the size and shape of the teeth must be decided upon, the perfect form of the ideal teeth must be in the mind's eye. The width of the teeth is then marked off on the

block, beginning at the central or median line, the desired width and height. With the straight carving-knife, and by cutting an inverted V-shape between the teeth, the necks are carved in a semicircular groove, not deep; have them to incline towards the centre equally on both sides.

The model is now reversed, and the points of the gum between the teeth are carved down, and then the body is added to each tooth to bring it up to the desired shape and size, and to look as natural as possible. The gum is then carved the desired thickness, and also to give shape to the block. The palatine surface of each tooth must be carved so as to antagonize with the opposing teeth. A recess must be made in the block for the pins. The pins are then inserted, and body worked around them.

Now comes the difficult part. To take the block off the model, heat the block over the flame of an alcohol-lamp (a large one preferred) until the spermaceti is all melted from underneath the block. The greater part of the spermaceti will be absorbed in the body. It will then be loose on the model. Now drop the block on a piece of cotton, and be very careful not to let it have too great a fall. While the block is cooling, which takes about five minutes, take a slide and put a sufficient amount of kaolin, say about one inch in height and enough in width to lay the block upon. Pick up the block with the thumb and forefinger and place it with the palatine surface, or pin side, on the kaolin. Now make about half a dozen cone-shaped pieces with the body, about one inch high. These are to be used as trial pieces.

The block is now ready for biscuiting. Biscuiting is the hardening of the block in a red-hot muffle. The furnace used for biscuiting and baking is an ordinary two-muffled furnace, purchased at any of the dental depots. First put wood in the furnace, then put the slide containing the block in the back part of the lower muffle, leaving the door open for the escape of the smoke which arises from the grease in the block, then start the wood to burning and put on about two or three bucketfuls of coal. Now, when looking at the block in the muffle, the teeth or block will be found to have turned black, caused by the grease in the block being burnt out.

As the fire increases, the muffle becomes red on the inside; the teeth will then resume their former shade; at this stage close the muffle-door, and wait until the muffle comes to a bright-red heat; then take out a trial piece and with a penknife cut to see if it is as hard as pipe-clay. If so, it is time to remove the slide containing the block from the muffle; check the fire by removing the stoppers

on the sides and top of the furnace. When the block is cool remove it from the slide, brush off the kaolin, and transfer the block to the model. It is now ready for enamelling. Enamels are technically called neck-, point-, stain-, and gum-enamels.

The enamels are then applied to the block with camel's-hair pencils by holding the block-teeth upward. Enamels should be mixed with clean water in a small glass or porcelain cup, making a cream-like solution. The neck-enamel is applied first at the neck of the tooth, extending half-way up the teeth towards the cutting-edge or point. The neck-enamels vary in color from bright yellow to dark brown. Now apply the point-enamel on the cutting-edge of the tooth, and bring the point-enamel down over the neck-enamel, so as to overlap or coalesce. The point-enamels vary from white to different tints of bluish gray and yellow. The gum-enamel is applied to the points between the teeth with the carving-knife; the rest of the gum-enamel is put on the block with a camel's-hair pencil, care being taken to place the gum-enamel close to the necks of the teeth, but not to overlap the neck-enamel. It is not best to make the gum-enamel very smooth; it fuses at a little lower heat than the point- and neck-enamels, and is apt to become glassy.

The festoons around the necks of the teeth should be ridged, so as to make them more natural-looking and give them a certain prominence and individuality of their own; so the teeth will look as if they had grown out of the gum naturally. Many blocks are ruined by not having the gum-enamel applied properly.

After the enamelling is all done, prepare a slide the same as was done for biscuiting, with this exception,—instead of laying the block pin-side down on the kaolin, place the block perpendicular, the cutting-edge of the teeth upward; enamel your trial pieces at the points with gum-enamel, and place them on the slide in front of the block. Now all is ready for the final baking.

Place in your furnace the side stoppers, add coal to the fire, and fill the furnace with fresh coal; then put in the upper stopper, close all openings around stoppers with fire-clay mixed with water. When the lower muffle is at a white heat the slide is then grasped with a pair of long tongs, the ends of which are flattened for this purpose. The slide is lifted and held before the muffle for about two or three minutes, or until the block is thoroughly dry, then put the slide into the fore part of the lower muffle and gradually move it towards the back part of the muffle. When you reach the baking part, which can be distinguished by the intense glow or white heat, close the muffle-door, and give the block about ten minutes' time;

then take out a trial piece with the tongs, and examine to see if the trial piece is fused or glazed enough; if not, bake about three minutes longer, take out another trial piece, and if it is fused and glazed enough, the block is done.

Now take the stopper out of the upper muffle; draw the slide from the lower muffle and pass it quickly into the back part of the upper muffle; close up the muffle with the stopper and close all openings with fire-clay; draw the fire and let block remain in the annealing or cooling muffle until cold. When cold the block is ready for grinding, which all blocks require more or less. Take a new impression and make a cast or model to grind the block to fit. To facilitate the grinding, the prominent parts of the cast are coated with a mixture of red vermilion and sweet oil which will spot the under side of the block and show the exact place to be ground off to make the block fit solidly on cast. After this is done it is ready to be mounted upon any base the operator may wish.

ON CONTOUR.¹

BY DR. T. G. HUNTINGTON, NEW YORK.

MR. PRESIDENT AND MEMBERS.—Much has been said and written in regard to the use, durability, and comparative merits and demerits of each and all filling-materials which are and have been in use for the purpose of arresting caries. So thoroughly has this subject been discussed that we sometimes feel that the last flaw has been found and the last virtue recorded, and that an end of the whole matter has been reached. Then some one puts forward a new form of an old material, or an old material with a new name. We try it, and commend or condemn it according as it stands our test.

Whether the material is new or old, commended or condemned, the discussion which takes place is fruitful and with some good results.

While filling-materials are still made the subject of discussion, it may not be amiss to review that which has to do with the efficiency of all filling-materials,—*i.e.*, form or "contour."

What I say upon this subject may for the most part apply to

¹ Read at a meeting of the New York Odontological Society, November 20, 1894.

all teeth, but I have in mind more particularly bicuspid and molars. The surfaces of all fillings are either flat or convex, and to make a flat filling is comparatively easy; but to restore the lost contour of a tooth with any of the filling-materials is quite another thing, and from beginning to end requires forethought and care, a greater expenditure of time, labor, and material. Therefore, if a dentist is to spend the best part of his life making fillings, why should he make convex or "contour" instead of flat fillings.

Whatever the agency which acts upon a tooth to first produce caries, that agency is no less potent, it is reasonable to suppose, after the carious cavity has been filled than it was before. If accumulation of decomposing foods has been the cause, a flat filling of any size affords a better lodgement for such deposits, and the efforts to cleanse the tooth will be less effectual after such a filling than they were when the convex surface of the tooth was presented; especially is this so when, as is usually the case, a V-shaped space is left, the angle being towards the neck of the tooth.

To keep such a space cleansed requires more vigilance than any one is likely to exercise, and the result is sure to be that the filling gives way, at the same time involving the surface of the approximal tooth. Indeed it is probable that this takes place before the first filling shows any signs of failure, and the point of decay comes so near the cervix that to fill the second cavity requires a great deal of cutting away of the convex approximal surface. When the work is done the teeth or fillings, or both, will be in contact from grinding surface to gum, or there will be a V-shaped space, which is worse.

Every dentist knows what then takes place, so far as these two fillings are concerned. The case would not be so bad, however, if the only evil resulting from flat fillings were to limit the period of their own usefulness.

The V-shaped space readily admits all sorts of material, fibrous and otherwise, and holds it. More presses upon it until the gum is forced away from its natural position. Particles of food become lodged under the gum, causing irritation and suppuration. It is by no means uncommon to see a cavity thus formed extending half way from the neck of a tooth or teeth to the apex of the roots. The alveolus and peridental membrane give way, and if there is any tendency to calcareous deposits, they find their way most readily to this secluded place and then carry on the destructive work. I believe that a great deal of the trouble which comes to the surrounding tissues of the necks and roots of teeth owes its

inception to the very process which I have described. I have chosen approximal surfaces of bicuspid and molars because I have always considered that these teeth, and especially the bicuspid, are difficult to fill, and fill correctly and permanently as any in the dental arch.

When a material or a method of manipulation makes secure against the inroads of decay the gum margins of approximal bicuspid fillings, that material or manipulation will be successful anywhere in the mouth.

There are in each arch of the adult mouth eighteen such surfaces, which are particularly liable sooner or later to require filling. We all frequently see cases where at least half this number of surfaces are either filled or require filling. Now, if all these teeth by reason of their filling lose something of their width, the aggregate loss in each arch would, at the very least, amount to the width of one molar. The contraction which results would perhaps be as great as though a first molar were extracted from each side. It is unnecessary to more than hint at the result of such an operation. The contracting arch first changes the direction of the crowns of the teeth as well as their normal position. This change disarranges the articulation of the entire set. This disarrangement through contraction, whether it occur by the loss of teeth or from the cutting away incident to frequent renewing of filling, produces an extreme and unnatural wearing of the grinding surface of the molars. The wearing shortens the bite and prevents the free motions of mastication. It also occasions a moving forward of the lower arch, which brings undue wear on the cutting-edges of the incisors, and also brings a force upon the bicuspid in mastication which when they are weakened by large fillings they are unable and never intended to support.

It may be questioned whether a flat filling need to detract from the original width of any tooth. I would simply say that it is not necessary, but is it not a fact, take them as we find them, that they do?

At this point it would be very easy to touch upon the occasion of flat fillings and why it is that they continue to be made. Undoubtedly a good many fillings which are started as contour fillings turn out to be flat ones. The contour being somehow lost in the process of finishing.

Some things must be defined negatively; and one way of emphasizing the necessity of the use of *contour* filling is to indicate some of the evils resulting from the lack of it.

The first requisite of contour filling is plenty of space in which to work. To get this requires a little time.—perhaps a week. Sometimes, however, when a tooth has lost its normal position by reason of a large approximal cavity in the tooth next to it, the wedging process is more of an operation.

How much cutting away should be done in the preparation of cavities is a question which probably might give rise to a great deal of variety of opinion and practice. My own theories and practice have been most in accord with those who believe in pretty free cutting of all frail portions, or portions which, unless cut away, will, when the cavity is filled, bring the line between filling and enamel in contact when the filling is finished with the neighboring tooth. The sacrifice of enamel and dentine sometimes seems unnecessary, but thus far in my own experience I have failed more often from the lack of free cutting than I have from the contrary.

If there were more cutting away of the lateral margins of approximal cavities at the cervix of teeth, I firmly believe that we would have less fault to find with the efficiency of filling-materials.

Where amalgam is used, is it not a fact that frailer walls are allowed to stand at the cervix than in the use of tin or gold; and does this not amount, in part, for its seeming lack in efficiency?

I have used the terms "convex" and "contour" in somewhat close association. They are not, however, synonymous. A contour filling neither adds to nor detracts from the normal size or shape of a tooth. When the arch is unbroken as far as the teeth may extend from the median line back, my plea is for "contour" filling.

The word itself and our knowledge of the relationship of each tooth with the others of the arch and both arches fixes the point of contact of approximal as well as antagonizing teeth.

In conclusion I would ask, How do you fill a pin-head cavity in the approximal surface of a molar or bicuspid?

Reports of Society Meetings

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE regular monthly meeting of the American Academy of Dental Science was held at Young's Hotel, Boston, Wednesday, October 3, at six o'clock, President Smith in the chair.

The paper for the evening was read by Robert W. Greenleaf, A.M., M.D., professor of Materia Medica, Massachusetts College of Pharmacy. Subject, "The Relation of Modern Therapeutics to the Practice of Dentistry."

(For Professor Greenleaf's paper, see page 152.)

DISCUSSION.

President Smith.—We have before us a very interesting subject, which has been very ably presented. According to the programme the discussion will be opened by Dr. E. C. Briggs, assistant professor of Materia Medica in the Dental Department of Harvard University.

Dr. Briggs.—I think I voice the sense of the meeting when I say that this is a most interesting and sound paper of Professor Greenleaf's. It might be said that he has represented the question and discussed it himself pretty thoroughly.

Such a paper as this cannot be otherwise than a spur to the older practitioners and an encouragement to the younger ones, who, I trust, are coming into the field with more of the foundation principles of therapeutics than was formerly the case. Only within recent years have I been able to clear from the catalogue of our school the term "dental materia medica;" as if there could be such a thing as "*dental materia medica*." The materia medica taught in the dental school at Harvard to-day is the materia medica of the whole field, and, according to the announcement of other colleges, that standard is being approached more and more all the time. Formerly the student was taught the use of certain drugs for particular conditions which he was brought in contact with.

I think we advanced long ago beyond the "make-believe" period, but we landed in the empiric stage, and there we have remained.

Somebody announces that he has used a certain thing for a certain purpose and it has accomplished the result desired, and immediately all begin to use it; and then somebody comes out and announces another thing that he is using, and like sheep all flock to that. In the Harvard Dental School the *principles* that underlie the action of all drugs are taught, and the aim is that the student shall understand what the principle is for which he uses a certain drug. And if he is not obtaining in the best manner the result desired, then he is ready to resort to some other drug if it contains the same active principle. We are getting down more and more to the principles of things and are abandoning the use of things either in the "make-believe" or the "empiric" form. It has been a little hard for us to get to that position, because so many of us have tried hard to maintain that the dental profession was a separate profession, and what we did, we did from a dental point of view; and we had a dental materia medica, dental surgery,—everything dental.

We are gradually finding out, however, that the best advancement even in the dental sense is made through the lines of modern therapeutics. I do not mean by that through the increased use of drugs, but modern therapeutics has given us drugs for the production of antiseptis and anæsthesia which are of invaluable service. The knowledge of the principles of these various drugs belongs not to the therapist, but to medicine, and this knowledge brings us to the point that we cannot help being specialists in medicine.

In the case of our Miller, who has done so much for the entire field of medicine, a great deal of the benefit to us has come more quickly because he was a dentist, and we follow his recommendations as if they pertained strictly to the dentist, whereas his researches, as we know, are applicable to all branches of medical science.

I shall not go into the details of the application of these drugs; the discussion will occupy enough of the evening. It is sufficient to say that the advice of this paper and the tendency of the times is to struggle more and more towards a thorough understanding of the principles and not following the empiric form of treating cases and applying drugs. Because such and such a thing has been advised and prescribed by some one who claims to have had good success with it, is not a sufficient justification for using it; we must know the effect we wish to obtain and the active principles of the drug which we are using to obtain it.

President Smith.—The subject is now open for general discussion.

To the guests present I would extend, in the name of the Academy, the privileges of the floor.

Dr. Williams.—I wish to express my appreciation of the scientific presentation of the subject which has been treated by Professor Greenleaf. The remarks in the first part of his paper remind me of the advice given by Dr. Weir Mitchell before a society of ophthalmologists. He drew their attention to the tendency in that specialty of limiting their thoughts to their specialty, so that their minds were not able to comprehend the relations existing between the eye and other parts of the body, and he showed them that the effect of such a course was a deficiency of knowledge which rendered them unable to practise to advantage even their own specialty.

Instruction in the principles of a science is a matter that I have for years advocated; and I have had several talks with President Eliot and others in regard to the importance of the fundamental principles in which this specialty as well as others should be educated.

I have sometimes illustrated the effect of a man confining his thoughts in one direction in this way: Suppose an accountant educated only within the limits of the addition, subtraction, or multiplication tables. Everything that comes along within the limits of those tables is promptly and accurately done; he does his accounting by rote, as it were. Give him something outside of the tables requiring knowledge of the more intricate principles of arithmetic, and he is unable to solve the sum. There has been too much of such practice in the dental school's instruction. The student is told, "This will do so and so," but no reason is assigned why it will do so, reasons which would be derived from the knowledge of *principles*. I also illustrated this matter some time ago in this way: Take the science of agriculture, which covers so broad a field that it is impossible for one man to understand all its branches; and it is necessarily divided into departments, such as the cultivation of fruits, flowers, and vegetables. It may be that one man's specialty is the cultivation of flowers; another understands the production of fruit and vegetables for the market, and so on, each man having a special knowledge of some one branch. But each must understand the *general principles* of agriculture as relating to any one of those specialties, as, for example, the effects of climate, the different kinds of soil in which the various plants will thrive best. And no matter how fine a knowledge a man may possess of any of the branches, if he is ignorant of those general principles, he is likely to make failures.

I think that when Professor Greenleaf's paper appears in the

INTERNATIONAL DENTAL JOURNAL it will be a great encouragement in the matter of general education.

Dr. Bradley.—I am somewhat interested in this subject, as we all are. Very many times in our profession we feel that some systemic remedy would be of assistance to our patients in inflamed conditions of the oral cavity. I very frequently inquire as to the systemic condition of the patient when there are unusually inflamed conditions,—that is, as to whether they are troubled with costiveness, biliousness, or anything of that nature, and suggest the use of slight cathartic medicines, and in the more marked cases consultation with their physician. In persistent cases of Rigg's disease I nearly always ask my patients if they have a gouty diathesis or any difficulty with the kidneys, and suggest a consultation with the physician. In some cases, where the patient has taken my advice, I have been very much disappointed to have the doctor tell them, "You have nothing of the kind," without ever making what it would seem to me a proper investigation of the matter, such as an analysis of the urine or a proper inquiry into the condition of the patient; and I have wondered if there was not some way in which such things could be ventilated and discussed, so that the two professions could work harmoniously together. The question has occurred to me whether it would be advisable that we should take up a course of study in dentistry which would include the analysis of urine,—I think such special instruction is given in some of the schools,—and we would then be more positive as to the best thing to be done for the patient. I merely mention those things in the hope that it will bring forth a discussion as to whether it would be advisable to send patients to a physician to have an examination made to detect any systemic difficulty, and whether we feel they would make a proper examination, or whether it would be advisable to sacrifice a little of our time for the purpose of equipping ourselves with a knowledge sufficient to make the examination.

President Smith.—I would simply say, in answer to Dr. Bradley, that the examination of the urine, which is included in the instruction under the head of medical chemistry, is taught in the Dental Department of Harvard University.

Dr. Bradley.—Thank you; I am glad to hear that it is. Of course, the matter of prescribing for such affections as I have mentioned comes entirely outside of our province. I do not presume to say that the dentist should take it on himself to give prescriptions in such cases, because in many instances the difficulty

requires the assistance of physician and dentist, and we two should go hand in hand in the treatment of disease.

President Smith.—One of our members has made investigations in therapeutics in a different school from the one which some of us adopt, and claims success. I do not know whether to present him to you to-night as from Chicago, or Cambridge, or Boston, but I know you would all like to hear from Dr. Taft.

Dr. C. H. Taft.—I want to add my word of appreciation of Dr. Greenleaf's paper. I must confess that in my experience and practice of dentistry within the last eight years, and more especially within the last three or four years, since I have begun to bring the application of therapeutics and a better knowledge of the *materia medica* into my practice for the treatment of cases, where I was wholly at sea with such kind of local treatment as I had been taught in the school, that I have questioned very seriously whether the dentist who makes a special study of therapeutics, and gives the results of such study subsequently to the profession, receives the support which it would seem that he should receive. I have been working in the field of therapeutics for some time past, putting a great deal of study for the benefit of my patients and for the purpose of giving to the profession the results of my observations and investigations, and I must frankly say that I do not think I have at all times received the encouragement from the profession to continue such study that I naturally feel I ought to have had. However, that counts for but very little, for I know that my patients have received the benefit of my work. I was glad to hear Dr. Briggs take the ground which he did in opening the discussion of Professor Greenleaf's paper, for it calls to mind the fact that about a year ago he read a paper before the Harvard Odontological Society, under the title of "The Dentist as a Prescriber of Drugs." I was in practice in Chicago at the time, and I remember with what interest I read the paper and the discussion upon it. Dr. Briggs took the ground that I was leading the profession into rather dangerous territory; that I was drawing them out of their legitimate field of work in encouraging the prescribing of drugs systemically for the treatment of any lesion that we might be called upon as specialists to treat where all other efforts had failed. But I am glad to see to-night that he has taken a little more liberal ground. If we are to give any special attention to the *materia medica* as it is taught in the dental schools, we must ask ourselves the question, What is the use of *teaching* the *materia medica*, if it is not to give the student a good general knowledge

of drugs, and to teach him how to intelligently prescribe such drugs whenever he deems it advisable? For instance, if we consider it advisable to give a medicine for the treatment and cure of an alveolar abscess, or for the relief of a toothache, we should know the reason *why* we give it, and it only comes from a patient study of the action of the drug and the laws which govern it. That is why we cannot make use of any one drug as a specific for the treatment of toothache, and say, when prescribing it, "I know this medicine is going to cure this toothache, because some one else has used it and it proved effectual;" and why not? Because, very likely, in nine cases out of ten it will not be homœopathic to the case, and it is for this reason that there never can be any specific for toothache or for anything else. I do not mean to say, gentlemen, that I have always been successful in the giving of drugs in my practice, in all the cases in which I have felt called upon to prescribe, but I do often have patients and such conditions to treat where, without the aid of medicine, I simply cannot do anything for them. In such cases, following out Dr. Briggs's advice as given a year ago, we would advise the patient to go home and look well to his diet, and pay special attention to the laws of hygiene. That is all very well so far as it goes, but when a patient comes to you suffering with a violent toothache, and you are powerless to relieve it by mere mechanical or surgical methods, then is the time when you require a knowledge that is something more than mechanical, or you will be obliged to send the patient to a physician or somebody else who can relieve him.

It was only by having such cases in my practice that I was first led to take up a closer study of the *materia medica*, and I began by taking one drug at a time, studying its properties and noting carefully its effects. As most of you here know, I take the ground that the homœopathic way of prescribing is the only truly scientific one. Dr. Briggs was just saying to me while at dinner, "How do you explain the action of the drug? How do you *know* that such a power of the drug does the work?" That question does not interest me so much as does the fact of seeing the drug which is given produce relief that is almost or quite instantaneous; that is the thing which we are most interested in. It is not the question of the potency of the drug or its method of action. For instance, *mercurius* is a very valuable medicine, to be given not only for certain forms of abscess, but for certain kinds of toothache.

Now, in a toothache where *mercurius* is homœopathic to the case, no matter what potency is given, whether it be in the high

or in the very low form, it will do good work. You may have another kind of toothache where mercurius will not have the slightest effect in relieving or stopping it, and why not? Simply because it is *not* homœopathic to the case. It is only by studying the properties and action of each drug and comparing them with the properties and action of other drugs, as for instance, comparing mercurius with bryonia or hepar, sulphur or aconite, or any other drug, which really enables us to apply a knowledge of materia medica intelligently and accurately. And it is only in so far as we are able to differentiate the properties and action of different drugs that they will be of any assistance to us where all other means and methods fail.

Dr. Williams.—I had an idea that some dependence was placed on the shaking or vibrating which increased the “potency” so called. Is not that a part of it? I would like to ask Dr. Taft if he can tell me if there is any influence of the vibratory action in producing the potency, and if so, if he can explain in what way it effects the drug?

Dr. Taft.—That, I am very sure, is a matter of experience among different homœopathic physicians. Very many of what are known as the Hahnemannians or strict homœopaths feel that it is better not to shake the solution even when the bottle in which it is contained gets nearly empty. For instance, when they are using a drug and the vial is nearly empty, they add the proper amount of sugar of milk to that bottle and find the power or force of the medicine which is still in the bottle is sufficient to permeate the whole, and the medicine has the same curative power as it would have if the solution were to be shaken up. But this is a matter of individual practice and experience among physicians. However, this is foreign to the subject of the paper, Mr. President, and I hope to hear the paper itself discussed.

Dr. Briggs.—I was sorry that I was called out as Dr. Taft was speaking, and therefore do not know just what to say in reply.

When I advocate dental students understanding thoroughly the principles that underlie the action of all medicines on the system in health and disease, it is to enable them to practise better their specialty and not to practise general medicine, and I have taken the point, as I did in that paper, that in all things that pertain strictly to his specialty he should know what to do and why he does it. But when it comes to the practice of general medicine, it seems to me that no specialist can undertake the general treatment of patients who require his services in a special direction; that the

value of his knowledge is more in the timely reference of his patient to the physician than for the purpose of prescribing himself. My point is not by any means to make a medical practitioner of the dentist, but to insist that as a specialist he should understand the underlying principles of medicine.

Dr. Taft.—I simply take the ground, Mr. President, that a dentist should never go outside of what he feels is his legitimate field in the prescribing of any drug; and in the treatment of such cases as Dr. Bradley has referred to I think that many of them do come entirely within our province for treatment with the ordinary dental therapeutic agents at our command. I believe that in a great many instances where the dentist is an M.D., for example, and one who has a sufficient knowledge of how to diagnose cases, that such a man has a perfect right to administer remedies systemically to patients upon whom he is operating. But whenever cases arise where the dentist feels that it is unnecessary to understand well the constitutional condition of his patient before prescribing, he had better in all cases turn his patient over to the physician. I have often wished, while doing what I could for the patient from a dental stand-point, that I had the knowledge to prescribe such remedies as would cure certain conditions often found in the oral cavity, as pyorrhœa alveolaris, for instance, but I have never attempted to treat the patient systemically, for I believe that in such cases I would be going outside of our legitimate field.

Dr. Williams.—Speaking of being an "M.D.," one would think that by the affix of a certain title you have the possession of certain qualities, just as the stamp on a coin indicates its value. What difference would it make if a man had a knowledge of principles whether his title was M.D., D.M.D., or D.D.S.? Would not a thorough knowledge of principles as Dr. Taft has advocated be more important than the name by which that knowledge is called?

Dr. Taft.—Of what value is knowledge of any kind to a man if he cannot make a practical use of it? When we are taught any one thing in our specialty, it is with the expectation that we shall make some practical use of it. Of course, our patients in coming to us do not expect that we are going to take any chances or do anything which would place their lives or health in jeopardy, but when we feel that we are working and practising intelligently in the field of therapeutics, then I claim that we have not only a perfect right, but that it is our duty so to do.

President Smith.—If the members have nothing further to say, I will call upon Professor Greenleaf to close the discussion.

Professor Greenleaf.—Gentlemen, I wish to thank you for your attention. It was quite a question what kind of a paper to present to you in response to the invitation of your Executive Committee. This very subject could have been subdivided and a paper written on almost any of its special topics, but it seemed to me that it would be more useful to take it from this broader point of view, and I am very glad to see that you so earnestly approve of the inculcation of a sound knowledge of the principles underlying your specialty, although some may lead more directly in their application to other fields of thought. I will not review the discussion in detail, but I wish to say to Dr. Bradley regarding the question of counteracting the presence of uric acid or anything of that sort in the blood.

I intended to express the idea in my paper that a study of the principles underlying such a condition and its treatment was of value to the dentist not for purpose of treatment, but to aid him in recognizing the presence of such a disordered state even if not exactly diagnosing it, and in knowing whether or not it affected the existing dental disease, also as a guide as to whether it was best to refer the patient to a physician.

Regarding Dr. Bradley's other point,—viz., his not liking to have patients, whom he has referred to a physician, returned with the answer, "Nothing is the matter," when it is obvious to him that there is,—I can see that sometimes this way may prove a somewhat delicate question, as patients sometimes show so little care in the selection of their medical advisers. Unfortunately there "are empirics" and "make-believes" in medicine to-day and doubtless many patients are in their hands. Nevertheless, there are plenty of thoroughly-trained, able physicians whose answer as to "what is the matter" could be depended on. A safe rule for a patient or dentist to be guided by is to take the same pains in their selection that life insurance companies and medical schools take in selecting the physicians to answer their questions.

There is one other point that I wish to notice. It is too late and the subject is too extensive to discuss it with any detail, but I think it is fitting to make a very concise answer to certain of the questions brought forward by Dr. Taft, relating to the value of what he has called homœopathic therapeutics.

You have seen how a drug is studied by a scientific physician, and from his investigations we learn that large doses produce toxic effects; that the administration of certain doses—for instance, one-sixtieth of a grain of strychnia—produces certain effects which

we call therapeutic; that a single dose of a smaller amount may produce an effect for a short time; but as the dose grows smaller no appreciable effects on the system are produced. These are not matters of guesswork; they are not matters of "belief;" they are matters of actual test and experiment as exact as anything that has been proved in the chemical laboratory. It would seem useless to pursue the discussion beyond this point, but it is entered into so honestly and earnestly at times that we sometimes feel it necessary to do so.

Much smaller doses of that very medicine, strychnia (under the name *nux vomica*, of which strychnia is an alkaloid), have been given with the "belief" that certain results have followed from them, and many believe, as Dr. Taft has said, that the more nearly infinitesimal the dose the better the results. One of the most prominent men in this so-called "school of medicine" has shown the fallacy, in his own words, of this belief in the high potencies, at least as regards triturations, after having pinned his faith on their great strength and prescribed them for years. He took some powered medicine, divided it into ten parcels, and to each one of those parcels added sugar of milk. He then subdivided each one of these into ten parts and added sugar of milk to them, and so on, until presently he had a degree of subdivision representing, as I call it, one-one-thousandth of the original strength; he now brought his microscope to bear on the powders, and with what result? In the first few packages he found traces of the drug, the next few parcels of the powder were found not to contain any traces of the drug whatever, and so on throughout his examination. Some parcels contained the drug and some did not, though he had hitherto been prescribing his powders considering that all had been very potent. He very honestly published his results, and from that time relinquished his faith in such "high potencies."

It is obvious that the "beliefs" of a character permitting such radical fallacies do not permit of serious scientific discussion, and while I might be willing privately to demonstrate their mistakes to any one honestly entertaining such views, it does not seem to me necessary or wise to publicly discuss them. Certainly it is not included in the scope of the paper which I have had the honor of presenting to you this evening.

WILLIAM H. POTTER, D.M.D.,
Editor American Academy of Dental Science.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

A REGULAR meeting of the Odontological Society of Pennsylvania was held at 1228 Walnut Street, December 8, 1894, Dr. C. N. Peirce in the chair.

After the transaction of routine business, Dr. W. M. Sharp read a paper on "Dental Furnaces."

(For Dr. Sharp's paper, see page 279.)

At the conclusion of the reading the furnace was exhibited.

This furnace is built of clay, and is of sufficient thickness to give volume of heat as well as the necessary temperature. In this respect it is fully equal to the coke or coal furnaces, while all discomfort and dust are avoided.

Besides its great value in continuous-gum work, it can be used for melting zinc, lead, or aluminum, and also affords a ready means of heating a case preparatory to soldering.

Dr. F. A. Coney read a paper on "Carving of Block-Teeth."

(For Dr. Coney's paper, see page 284.)

After both papers had been read, Dr. Peirce, the president, called upon Dr. D. D. Smith, of Philadelphia, to open the discussion.

Dr. Smith responded as follows:

Mr. President and gentlemen, there is little, it seems to me, that can be said upon a subject like this. Thirty years ago, and even later than that, we should have taken a great deal more interest in carving block-teeth. It has been said that there have been no advancements in the line of mechanical dentistry. This seems to me to be a mistake, for there have been a great many improvements made in this branch, and especially in the line of artificial teeth.

For one to be fully skilled as a carver of teeth requires an apprenticeship and experience which very few men are willing to give to it. It does not take a high degree of intellect, but it takes a manipulative finger, which belongs to very few practitioners of the present day.

So far as I know, since Dr. Barstow passed away, there is but one man in the city of Philadelphia that makes any special practice in carving block-teeth. There is scarcely a student but will show you specimens of his carving, but they are simply specimens. They make them possibly in their college course as a matter of curiosity to see what can be done, and immediately on

receiving their degrees they forget all about the dirty furnace-work,—for there is a certain amount of dirty work connected with a furnace of any description. I have had at least twenty-five years of solid experience in making continuous-gum work. But my young friend here who read the paper—an admirable paper—cannot tell me a single thing about the management of a furnace. He can tell me a great deal about carving teeth, but it is impossible to make furnace work clean. If you use the old-style furnace, you must go where there is a draught; you must go to the cellar, where the chimney is longest. Now, to go into the cellar a man must don old clothes and overalls, and he must go himself; he cannot send a student or an assistant, if he would have the work done carefully.

The carving of teeth, in practices such as the gentlemen of this city are engaged in, is largely time wasted. Not only on account of the things I have mentioned, but because we can go to our dental depots and get almost everything there. Twenty-five or thirty years ago we could not find the line of teeth in the dental depots that we can find to-day, and when we look them over carefully we see that an incredible amount of thought and care and experience has been bestowed in that direction. Throughout the whole domain of ceramic dentistry there has been a constant upward tendency, and it has not been done by men highly intellectual, but by unskilled labor, with the various steps specialized. For dentists who are educated to-day, who have three years in a dental college, I do not advocate nor believe that it would be well for them to spend their time in the work of carving teeth. The province of the dentist to-day is to combat the diseases of the natural teeth. In a city like Philadelphia there are only about two hundred thousand out of one million who know anything of the benefits of dentistry whatever, except extraction. This is a condition of things that ought not to exist. Though we have three dental colleges filled with dental students and the paraphernalia for advancing the dental profession, still I say that dentistry would take a step backward if all the young men were compelled to give the time to acquire this handicraft and skill.

As the gentleman read the paper I was impressed with the thought of all the manipulations that enamelling teeth involved. He could tell you that it took five years of pretty close practice before he could enamel a set of teeth and get a result that was *anyways* satisfactory to him the first time.

I know what a difficult thing it was to carve teeth and to crown the *gum-enamel* in such a way as to bring good results after the

case was fused; and a dentist can hardly expect to put the enamel on and bring out any such delicate shades as we find in the dental depots at the present time. I do not say but that the teeth are poor enough; there is ample chance for them to be improved, but there has been a great advance in this regard in the manufacture of teeth. We ought to have those who are qualified to do this carving. As dentists it is not necessary for us to do these manipulations, but it is necessary for young men to have a little experience to be able to tell what they want to a mechanical dentist. A single mechanical dentist could make all that we would need in Philadelphia. Why should we devote ourselves individually to this class of work? Let us look to combating the diseases that are incident to the natural teeth.

In regard to the furnace, I would like to see it in operation. The one at the American Dental Association was new; I should say from the looks of this that it had been burned. Have you tested it enough to know whether it will do the work you say it will?

Dr. Sharp.—Yes, sir.

Dr. Smith.—Every practitioner who cares to do mechanical dentistry can learn now to do continuous-gum work, although it is more difficult than the carving. The results are more uncertain and always will be until we get some different material for the base of continuous-gum work. With this furnace the work is remarkably simplified. This is the first gas furnace that has ever been called to my attention which would do the work. We need volume as well as intensity. We have had intensity but not volume which would be necessary to satisfactorily fuse the material. I have lightened continuous-gum work by using thin plates up to No. 31, so that it would bend in soldering the teeth. About two years ago I sent especially to England for some palladium to get rid of the platinum or heavy metal, for the weight of it lies in the metal largely. I washed the palladium, knowing it was infusible, but I did not know its working qualities under heat. It has the same specific gravity as silver. It has the appearance largely of platinum, a little duller in color when polished, a little more blue. It has more the appearance of aluminum. The palladium necessary for a case cost twenty-two dollars. When sufficient heat was brought upon it to fuse pure gold, at 2012° F., a slight oxidation appeared and the blue color in the polished palladium became tarnished. After soldering the case (it took the solder well) in the repeated fusing the solid material became porous and the oxidation came

out very distinctly and colored the body all through with a bluish stain so that I could not overcome it with the enamel. It had not that spotty appearance which the platinum has when it is soldered with alloyed gold. I made the case over with platinum, and that is the best we can do. I think there is no other metal on which you can count for continuous-gum work. You can work No. 29 platinum in connection with continuous-gum work, but thinner than that will cause failure.

Dr. Truman.—While I agree with my friend Dr. Smith in his general remarks, and feel that his statement is exactly true that we must aim for something that might be called higher work, still as he has a love for continuous-gum work, so I look back with feelings of pleasure to the time when I had to do mechanical work. I feel that there has been a weakness in dentistry of later years. Ever since metal work was practically abandoned by the general profession we have experienced a loss in the direction of mechanical dentistry, and while bridge-work and crown-work has made it up to some extent, the profession, as such, cannot begin to compare to the days when we were obliged to work gold and silver entirely.

Now, it is a pleasure to me to listen to a paper by a man who comes forward at this late day to advocate block-work. In my recollection as a boy and as a young man, it was one of the most unpleasant parts of dentistry I had to do. As Dr. Smith says, first carve your teeth, biscuit them, etc., then go down into the cellar and burn them, and sit there until that process is accomplished; after that go on day after day and week after week making porcelain teeth. I have no desire to go through it again, yet at the time I had a feeling of pleasure that would almost make me wish to do it again. And I agree with Dr. Smith, if we only had some man who would be willing to do this class of work in conjunction with other kinds of mechanical work exclusively, it would be a great benefit to the profession to-day. As he has stated, there is no one in Philadelphia that does that work. We need them. We cannot always get satisfactory teeth at the depots.

Dr. Faught.—I would like to ask Dr. Sharp if the platinum muffle has any advantage?

Dr. Sharp.—I have given that some study. Personally I feel that I could get as good results from clay as from platinum. I will give a little demonstration, which I think will be valuable. I have with me a little piece of platinum plate, which I had intended to use in baking the porcelain this evening, but the gas has not been sufficient, and I will use it for this purpose.

In my research or inquiry of the different metals, I find it is a fact that hydrogen will pass through palladium and platinum by diffusion at red heat. This is not so when platinum is cold. I think I will prove this assertion to your entire satisfaction. For that reason I have my doubts about it being superior to clay in continuous-gum work when there is perfect combustion in the furnace. As the hydrogen gas comes in contact with the metal it takes atmospheric oxygen from the atmosphere and produces combustion in the pores of the platinum. If I heat this platinum red hot, and allow it to get partially cooled, and then replace it over the unlighted gas, it will gradually get red and ignite the gas, again showing there is combustion of the gas going on in the pores. (The doctor during this description held the piece of platinum over the gas-jet until it became red, then took it away from the jet and allowed it to resume its natural color; then holding it over the escaping gas again, the flame having been blown out in the mean time, the metal became so hot that the gas was again lighted.) This is good proof that combustion of oxygen is going on in this metal. I don't think there is any advantage whatever in a furnace having a platinum muffle. The disadvantages are that it is very expensive; does not give volume of heat; if the least trace of zinc or lead gets on it by accident, it will be spoiled.

ACADEMY OF STOMATOLOGY.

THE meeting of the Academy took place March 12, 1895. President Dr. Jack in the chair. A paper was read by Dr. Harrison Allen, entitled "Diseases of the Maxillary Sinus."

(For Dr. Allen's paper, see page 261.)

DISCUSSION.

Dr. Essig.—I have had very little experience in the treatment of cases of diseases of the maxillary sinus. Within the last two or three years I have had two of some interest. One was a gentleman, the origin of whose trouble I was ignorant of. He came to me from a doctor in New York who had commenced treatment and had removed the first molar tooth, and had made an opening into the sinus and had introduced a silver tube. The discharge in the case was very copious.

When the gentleman came to Philadelphia to reside he found some difficulty in continuing the treatment. He would be sometimes three days in Philadelphia and then on the road for three months, and during that time the sinus was not irrigated or washed out, and the remedy was not applied.

I found he was not only intelligent, but quite handy in the use of instruments, and I obtained for him one of the little India-rubber syringes, such as we use every day in our practice, with a metallic point, and he took with him Seiler's tablets; with one of these dissolved in water, by the assistance of the little syringe the sinus was washed every day. When he was in Philadelphia he would always come to see me, and I occasionally removed the tube and renewed the ligatures attached to the neighboring teeth.

Finally, he was absent for three months, and when he came back I found the tube had been removed, the fistula had closed, and the sinus was quite well. There was no great difficulty in producing a cure so long as he could receive proper treatment.

Another case which came to my notice very recently was the result of an alveolar abscess of the first molar tooth which had been applied with a Richmond crown. In that case I felt very anxious, and was very much afraid the patient would have a serious time. Finally, the abscess was ready to be opened with a lance; after that the trouble subsided, and is now quite well. The discharge from the maxillary sinus into the nasal cavity of the mouth was quite large. After one of the visits she made some remark that arrested my steps before I reached the door, and I found her leaning over the banister. She said, "Just as I spoke to you an immense amount of fluid seems to have run out of my nose." Of course, I felt anxious about the case, and thought that if within a few days the symptoms did not subside it would be necessary to remove the first molar tooth and establish an opening; and I found that after the abscess was removed the swelling disappeared, the soreness subsided, and there was no further discharge or trouble with the sinus.

I had received the idea, probably, from Dr. Gross's teaching, or from his *System of Surgery*, that cases of trouble in the maxillary sinus were not only exceedingly serious, but very apt to take a malignant character; and I was very much afraid that the latter case would not get well without further and perhaps surgical treatment other than removal of the tooth and opening into the sinus; but I was very much gratified to learn that all the symptoms had disappeared.

My experience is limited, and I have often thought it curious that in more than twenty years of active practice I have met with but those two cases of trouble of antral inflammation. I do not hesitate to say they are exceedingly rare, in our practice at any rate. I know of no other than the two I have mentioned in all that time, out of a fairly large practice, where I have found any trouble or where it was necessary to treat. I know of no patient who has gone into the hands of a general practitioner or surgeon.

I would be very glad to hear from other members of the profession. My experience has certainly been very limited.

Dr. Cryer.—It gives me the greatest pleasure to have this opportunity of listening to Dr. Allen, not only for the knowledge I have received this evening, but also because he was my first teacher of the anatomy and surgery of the maxillary bones. He was also the first one whom I saw use an engine for bone surgery. This was while I was a student, some time in 1875; and, if I remember correctly, the operation was for the removal of an osteophyte under the upper lip near the symphysis of the maxillary bones.

It has been my very great pleasure to see Dr. Allen operate on the superior maxillary bones and their associates many times, and am indebted to him for a great part of whatever knowledge of the subject I may possess.

I have a case now that may be interesting, as I have been unable to stop the flow of pus. The patient came to me about two months ago. The first molar had been extracted, and in looking at the parts they appeared to be in a healthy condition, but when the mouth was thrown widely open, the pus would exude from where the tooth had been extracted, and in opening and closing the mouth frequently it appeared as though it pumped the pus out; the posterior wall of the antrum had broken down by caries or other lesion. In treating this antrum by different fluids, using peroxide of hydrogen, it was impossible to get any of the fluid forced into the nasal chamber, from which I concluded that that opening between the antrum and nasal cavity was closed; it was difficult to syringe the antrum from the small opening; thinking best to open it wider, the second molar was extracted, and by the use of a small surgical bur, the opening was made so that a syringe could be used of considerable size, and the cavity might be flooded or irrigated. It responded to treatment for a short time fairly well, but I noticed to-night there is still pus in the cavity, not having had it washed during the last two days. You can see a pulsation at the opening.

We have with us Dr. Gleason, who is interested in diseases of the antrum, and I would be very glad to hear from him.

Dr. Gleason.—My experience has been very limited in diseases of the maxillary sinus, so that it hardly seems worth while for me to say anything about it. I think I have had only five cases. I cannot remember more than that number. Of these, three of them were from causes outside of the teeth. If I am not mistaken, Dr. Bosworth, the well-known writer upon such diseases, states that diseased teeth are regarded as mostly the cause of maxillary sinus, yet rhinologists will take a different view of the subject, and consider that lesions of the maxillary sinus are more often of the intra nasal region.

In the first of these cases that came under my observation the trouble was acute in its nature, being the result of a cold: a rheumatic individual had caught a cold and got well inside of ten days; at least, it was not over two weeks before the symptoms of the disease of the maxillary sinus ceased.

In the second case, the disease was apparently the result of nasal polypus, with symptoms of empyema of the parts from time to time. In the mean time she consulted her dentist, and during that time the disease of the maxillary sinus developed, apparently, and was treated by the dentist. She was not cured at the time I saw her.

In the third case the anterior turbinated bone had been lost as a result of syphilis, so that it was possible to look from the nose into the maxillary sinus and see what came from it. During one or two attacks of cold the nasal membrane became very much congested. It lasted for a length of time and finally subsided.

On another occasion, inflammation of the sinus was followed by a somewhat copious discharge of serum. In the third and fourth of these cases it was the result of disease of the incisor teeth, and involved the bone above so that the maxillary bone became necrosed, the result of the extension of the inflammation of the sinus. The right side was involved, and there was purulent inflammation of the cavity.

A temporary relief of the affection was brought about somewhat promptly by washing it with peroxide of hydrogen, a fifteen-volume solution, and afterwards following that up with a four-grain solution of nitrate of silver to the ounce of water,—four grains to the ounce. A solution of that strength is so strong that often if care is not taken it will irritate the mucous membrane greatly before washing the nasal parts.

There were one or two relapses, however, in this case, but an ultimate cure of the affection was brought about.

Dr. Currie.—I would like to ask Dr. Allen in regard to a case I had. It was the second week after I graduated. I went into a rural district, and I think it was the third or fourth call. An old lady, of about sixty years of age, who said she had something the matter with her "gooms," and wanted me to look at them. There were no teeth from the cuspid tooth back, and it did not look as if there had been for years; but she insisted there were some roots there and that they hurt her. She had been to the doctors a good deal and they told her she was only nervous.

I took a lance and passed it through the gum into the antrum, and there was a discharge of most offensive pus. I treated her, and before the end of the second week she came in and complained very much of the other side of the face, which was quite swollen. I opened that, but it was three months before the parts healed.

The question I would like to ask is, Would you place this in the five classes? I was not able to locate the cause, unless it had been from catarrhal trouble. She had been treated some years before for this disease. I saw her several months afterwards and there was no discharge. I thought perhaps it was not from catarrhal trouble after all.

Dr. Darby.—Dr. Allen said that these diseases are more common than we imagine. After making that remark I recalled the instance of a surgeon of this city who called upon me twice if not three times during the past twenty years to have me examine the teeth carefully under the antrum to ascertain whether there was any dental cause which could give rise to abscess of the sinus. I found on each occasion that the teeth were perfectly sound, and I had no reason to believe that this abscess or this condition came from the teeth. It came each time after a severe cold and catarrhal condition, and he complained not only of great fulness in the mucous passages of the head and masticatory muscles, but also complained of a discharge when lying on the left side, a discharge from the nostril; from this he suffered a good deal of pain.

In a few weeks after the catarrhal condition passed away, the pain ceased, and he had no return of it until another violent cold. I have seen him three times in twenty years with just that condition, so I presume there is a catarrhal condition of the membrane lining the antrum, which is not dissimilar from that which we have in the nasal passages. Am I right?

Dr. Allen.—The discussion has been very instructive and several points have been brought forward which are new to me. I have not had the experience that Dr. Gleason gives. I presume from what Dr. Darby said that he has recognized this transmission of irritation from the nasal chamber to the nose in a form by which he was enabled to diagnose the inflammation of the sinus. It only goes to show how narrow one's experience is. I have now, and I suppose all of us have cases come to us, sometimes several cases, and then they will go away and you will never see anything of them. It may be in the order of causes I should say that dental causes are more frequent than others,—Dr. Gleason would evidently not agree with me there. Of course, I give my conclusions only from my own experience. For my own part I would not make a diagnosis without illumination.

The case of the old lady is entirely new to me. I have seen plenty of cases in which the bones were so thin that the lance would have gone through the slight barrier between the gum-line and the anterior sinus, but for an old person to have pyæmia is a very interesting case, and the opening with the lance is, I believe, unique. I think the case ought to be reported.

Dr. Essig states that he has had but three cases in a practice of twenty years. I think a post-mortem examination would show it occurs more frequently than that. In the University of Pennsylvania I took all the refuse of the dissecting-room and had the heads separated and prepared for study. They were macerated and afterwards boiled, and out of twenty-five cases I found two in which there was a cheesy appearance of the maxillary sinus, which in that proportion would be eight in a hundred.

Now it is probable that in the lower classes we may see it more than in the higher classes. The cases are not, perhaps, so likely to be found in private practice as in the dissecting-room.

Dr. Essig.—Dr. Allen's suggestion that cases of that kind are not so likely to be seen in private practice as in a dissecting-room is probably true. I think a practice among the better class of people that is kept well in hand is not the very best place to observe other than our ordinary dental operations.

Some time ago, to illustrate, I wanted two or three samples of Hutchinson's teeth. I had not seen a Hutchinson tooth in my own practice in twenty years, and I had to ask Dr. Risley to look out for them among his clinical patients. In the course of a few days he was able to send me quite a number of little patients with typical Hutchinson teeth, and I was able to get an impression of

them so that I procured quite a collection. In my own practice I would never have been able to secure them.

In these cases of antrum troubles, I would like to hear the experiences of my colleagues and what their experience has been. If I were asked I should say these cases are exceedingly rare.

Dr. Burchard.—In all the text-books, including that of Dr. Allen, in the description of the antrum it is said that the roots of the molars frequently perforate its floor. I want to know whether there can be any accurate anatomical description given of the covering of the apex of the root? That is, have preparations been made, showing the histological relations of the root-covering in such cases?

Dr. Allen.—I do not know.

Dr. Burchard.—In using peroxide of hydrogen for irrigation I have neutralized the acid in it with peroxide of sodium. It may be alkalized and at the same time the volume of oxygen may be increased.

Dr. Allen.—I am glad to know that.

Dr. Gleason.—My experience has hardly been sufficient to base a rule upon, but Dr. Cryer has some at present, and could give more information on the subject.

Dr. Jack.—In my experience of forty-one years I have had but one case, with which Dr. Allen is familiar.

Dr. Cryer stated, in reply to Dr. Gleason, that the cases he has in hand at the hospital are cases coming from different parts of the State and outside of the State, so that it is not a fair average to take as a general class of patients. At present there are three reporting to the hospital with antrum troubles.

Meeting adjourned.

Editorial.

THE WRONG USE OF WORDS.

THE younger writers of the present period and perhaps in all epochs of the world's history have been prone to luxuriate in prolixity of words and superfluity of expression. The art of simplicity in writing seems difficult of attainment and perhaps few of us have a comprehension how very nearly this lies to clearness of thought. It is a truism to say that in order to think we must clothe the thought in words, but it is equally true that it is possible to think without words, although this may seem impossible to the ordinary observer. Words are the representatives of pictures and these were translated originally into root-forms, and through combinations with each advancing wave of civilization language was established. Science was added to science and the vocabulary of the learned became more and more specialized until those only can hope to master it who have engaged in the particular line of work it represents. Technicalities have been added to technicalities until we are burdened with a multiplicity of tongues among all civilized people known only to the few and a jargon to the many.

That this is true must be evident, and we are constantly threatened with increased additions in the multiplication of new words by the introduction of the so-called improved nomenclatures. Fortunately for the world of thought, words are not made to order, or at least are not assimilated into the language of a people or in a science in that manner.

The most important consideration in the use of language in the writer's opinion is in a direct translation of the idea into the simplest form of words attainable. It is a recognized fact that the best writers of the English tongue to-day, or at any former period, have been those using but few words of many syllables, and the nearer they have been able to express their ideas in simple forms have they been appreciated and regarded as models of style.

We have been impressed very often in professional reading with the fact that there was a positive need of a better training in this direction. We all have a tendency to a multiplication of ponderous

words, as though the number of high-sounding syllables increased the force of the idea to be presented. Writings of a scientific character need above all others simple language. The difficulties that surround subjects of a recondite character make this imperative, and yet how often is this plain rule violated by writers who load their subject with technicalities, new and old, to an extent that deprives the essay of much of its value. Words are useless if they cloud ideas, and nowhere is clearness of expression more needed than in professional writing.

Akin to this and of more importance is the use of simple words in teaching. While it is true that teachers are born and not made by pedagogic training, there yet remains the possibility of producing a satisfactory teacher out of the ordinary professional man, provided the latter is absorbed with the subject and will avoid the error of over-phrasing, not inaptly expressed by having "digested a dictionary."

The use of technical terms is necessary within certain well-defined limits, but these may be easily overstepped and the writing or the teaching become a burden to the reader or the auditor. An excellent rule to follow in addressing a class is never to make use of a technical word if another can be found to explain the idea. This given and firmly engrafted on the mind it may be followed by the proper word. A valued friend and teacher always stops to explain the meaning of a technical term. This to our comprehension is not the best course to pursue. Definitions are rarely of value, as all know who have undertaken the study of a language by the aid of a dictionary. The thought must be absorbed before the word can be comprehended. Hence the folly of showering a class of young men with terms beyond their powers to utilize and expect to have them understand the subject-matter of the lecture. This is too often the mistake of professional teachers. The rule should never be forgotten to make the subject but a degree above the most ordinary mind present. Complex problems in our specialty, as in all other branches of medicine, are sufficiently difficult without increasing this by a redundancy of technical forms.

The evil is one rapidly growing in our literature, and it seems a proper time to call attention to it, especially to those fresh from college life who are apt to imagine that learning is best expressed by the use of the longest words, and that unless their ideas are thus clothed the essay will fail of proper recognition. This is a common error not by any means confined to the class mentioned.

The tendency to pedantry in writing is another defect. Use of

foreign words not domesticated in our tongue, or an occasional Latin or Greek phrase, better expressed in English and which rarely represent in their use solid learning, add nothing to the value of an article, nor is the reader better able to understand, by their presence, the ideas the writer hopes to convey to the mind.

Allied to this is the search of some for a style. This has been the bane of many young and ambitious writers of all ages. It is never to be found by searching, for it is ever elusive. Style is the natural expression of the individual improved by culture. It would be as sensible to expect to acquire a good voice by searching among the singers of the world as to hope to acquire a correct style by reading the masters of word-expression in any age. As the voice can be improved by cultivation intelligently applied, in like manner the ability to embody thought can be enlarged and improved by cultivated practice.

Technical terms are important and of vital necessity in their proper place, but it is idle to expect that the young mind can absorb them at once, nor would it be desirable that they should. The professional man must learn to think in the terms he uses and until this be accomplished the idea represented cannot be absorbed, and it is just this condition that all first-year students are in to-day, a fact to be remembered by all teachers of dentistry. It is with the object of drawing attention to this subject that these ideas have been brought together, a plea for simplicity of language in all our professional relations.

Bibliography.

TRANSACTIONS OF THE WORLD'S COLUMBIAN DENTAL CONGRESS.
Two Volumes. Edited for the General Executive Committee.
By A. W. Harlan, A.M., M.D., D.D.S. Assisted by Louis Ot-
tofy, D.D.S., Chicago, Illinois.

The length of time that has elapsed since this Congress was held, now a year and a half, seems to give these transactions something of the character of ancient history, yet when these carefully-prepared volumes are examined, covering fifteen hundred and seventy-nine pages, the question seriously arises, how the editors accomplished their arduous labors so soon? It was certainly an

herculean task to arrange, and to finally give to the world the difficult material left them by the great convention. That this has been well done the dental world will, we think, universally acknowledge.

We wish we could say as much of the papers presented. A careful review of these two volumes leaves the same impression that was received at the time the Congress was held, and for all practical purposes the tremendous task the *Dental Cosmos* imposed upon itself was as well done and gave as good a general idea of the work performed as these bulky volumes can possibly give.

There is much in them of lasting value, some papers that will live, many that should never have been there, and in one instance, at least, one that should have been of deep interest if properly prepared is left out entirely. Allusion is here made to the history of dentistry. The editors propose that this should be published in a separate volume. This may be the best course, but unless published by individual aid it is not likely to reach library shelves. As a matter of dental history, if for no other reason, those not supplied with these transactions should send early and secure copies, as the supply is limited.

DENTAL MEDICINE: A MANUAL OF DENTAL MATERIA MEDICA AND THERAPEUTICS. By Ferdinand J. S. Gorgas, A.M., M.D., D.D.S. Fifth Edition, Revised and Enlarged. P. Blakiston, Son & Co., Philadelphia, 1895.

This work of Professor Gorgas is so well established in reputation as a text-book in dental colleges that it would seem superfluous to do more than announce the rapid sale indicated by the present issue.

It was very unfortunate that the author or publisher permitted the fourth edition to run out just previous to the opening of the college term without a reissue, and now it is too late to be of much service this year.

While the number of books on materia medica are legion, no one of them is exactly fitted to meet the needs of the dental student except this of Dr. Gorgas. In expressing this it is not to be understood that it is regarded as perfection.

Exactly why the author has persistently failed to notice criticisms on previous editions may be best answered by himself or the publisher, but it certainly is not to the credit of some one that "Chas." Truman still remains on page 175, when special attention was called to it in a former review.

The author is not justified in continuing the paragraph on page 178, beginning, "Arsenious acid is also employed in dental practice to obtund the undue sensitiveness," etc. If this is to continue as part of the text, colleges should refuse to longer accept it, for certainly it is not to be credited that any respectable practitioner makes use of this agent for this purpose.

The paragraph on the "dental uses of aconite" still remains as it was in other editions. The author is entitled to his views on this subject, but to the writer they seem very erroneous.

In the use of nitrate of silver, no allusion is made to Dr. Stebbins's valuable and original suggestions for its use in deciduous teeth, but in place thereof he gives Dr. Peirce's use of blotting-paper saturated with the agent. Now, as the preparation of the latter was based on Dr. Stebbins's suggestions, it is difficult to see why proper credit has not been given.

The author still continues the imperfect statement regarding the use of chlorinated lime in bleaching teeth, page 287, and gives no credit to the author of the process.

No mention is made of the use of quinine in local treatment of gingivitis, pyorrhœa, etc., yet its use has been before the profession for several years.

We regret to be obliged to call attention to these specimens of careless editing, but neither authors nor publishers have a right to issue and reissue defective publications after attention has been called thereto.

The book has been enlarged by the addition of a number of recently introduced agents.

CATCHING'S COMPENDIUM OF PRACTICAL DENTISTRY FOR 1894. By

B. H. Catching, D.D.S., Editor and Publisher, Atlanta, Georgia.

To close up the work of the year 1894 and issue this book of three hundred pages early in 1895 must have been a labor that strained the energy of the editor, great as that is known to be. It is doubtful whether the work connected with abstracting the pith of articles in the numerous journals in this country and Europe is appreciated. The book must be entirely written out, and to do this intelligently requires an ability of a peculiar order. This the editor, Dr. Catching, certainly possesses.

The compendium has become a necessary addition to the dental library, for by its aid the busy operator can see at a glance the important work of the year condensed for practical use.

It is a satisfaction to find that the publisher has adopted the suggestion of this journal and secured efficient aid from foreign countries. In time this will have a greater development than is manifested in this volume, and it is hoped it will eventually become the depository of the yearly work of the world in dentistry. To accomplish this Dr. Catching needs and should receive the cordial and earnest assistance of professional men everywhere. This can best be accomplished by procuring the compendium and thus securing a large circulation.

DESCRIPTIVE ANATOMY OF THE HUMAN TEETH. Third edition. By G. V. Black, M.D., D.D.S., Sc.D. Published by The Wilmington Dental Manufacturing Company, Philadelphia.

It seems scarcely necessary to do more than refer to any book having Dr. Black's name as the author, and this is especially true with this valuable production from his pen. That it has filled an important place in the instruction of students is evident from the fact that the first edition was issued in 1891, and now at the beginning of 1895 the third is demanded.

The illustrations are not only satisfactory as representations of correct forms, but they are arranged in the best possible way for study.

Dr. Black in this edition has made but few changes in the nomenclature, evidently feeling that it is wise to move slowly in this direction. "The changes . . . consist of one new word, *axial*, two new word forms, *occlusal* in place of *occluding*, and *incisal* in compound forms."

The author deserves and should receive the credit of having through this book inspired a wider interest and more exact study of tooth forms than was thought necessary in the earlier dental education. For this and much other faithful work the dentists of the country owe him a large debt of gratitude.

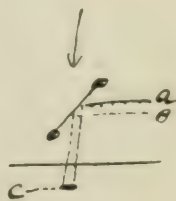
Domestic Correspondence.

REPLY TO REVIEW OF BÖDECKER'S BOOK.

TO THE EDITOR OF THE INTERNATIONAL DENTAL JOURNAL:

SIR,—In your review of Bödecker's book, you charge that there is "no real evidence to prove the correctness of the theories advanced," and that the "views . . . are based solely on drawings in which the personal equation is a prominent factor, . . . for the drawings are all by Heitzmann." And you state that "drawing however beautifully done, and Heitzmann is a master in this direction, cannot carry conviction. A few photo-micrographs would have accomplished far more." Also, "it leads to the suspicion, whether justly founded or not, that either the slides cannot be represented or that they have no real existence." And, "it would seem that no expense should have been spared to meet this demand."

Heitzmann discovered the reticulum. He gives you drawings of it in the different tissues. This is the prime evidence. Others have seen and made drawings of the reticulum and speak and write of it. This is certainly good corroborative evidence. Then both here and in Europe are those who have seen and made drawings of the reticulum independently of Heitzmann. This is also corroborative: sections which show the reticulum have been photographed. A section must necessarily be examined at high powers of the microscope in order to see the reticulum. But no photograph yet produced of a section at such high powers can show what the eye can see. Even the thinnest section has a thickness which is very great when magnified by a high power, and the filaments of the reticulum do not lie on the surface nor all in one plane, but are in planes at innumerable angles with the line of sight. The reticulum is not an open network, but is embedded in a material not altogether transparent; so, for instance, take a filament at an angle of 45° , and at high powers only a very small portion is in focus, as at *a*, *b*, and would only show as a dot or very short line, *c*, unconnected with anything else, whereas the eye could follow that line by focussing, and the ob-



server, if expert, could of course follow out such lines and draw what he sees, and in that way show the reticulum as it is seen.

We hope at an early day to succeed in making a photograph just as the drawing is made by composite action of a number of negatives at different focal distances. Then we will have some astonishing revelations, such as we have synthetically in Marey's or the kinetoscopic photographs of objects in motion. Certainly with the wonderful improvements in high power microscopy and in rapid photography the correct combination will come soon. Meantime, Heitzmann's master drawings are not only better, but better evidence than present photographs.

Heitzmann's answer to doubt is the only correct one,—come and see. Come to his laboratory and learn how to see. Any one who is unable to see the reticulum does not know how to see it. He that will not accept Heitzmann's drawings will not accept even the coming photographs, and probably he that will not accept these evidences is not willing to go to the expense of time and trouble to learn how to see for himself; certainly that individual expense should not be all saddled on Heitzmann or Bödecker, *et al.*

F. A. Roy.

Current News.

ANNUAL MEETING OF THE HARVARD ODONTOLOGICAL SOCIETY.

THE Seventeenth Annual Meeting of the Harvard Odontological Society was held at Young's Hotel, Boston, February 23, at five o'clock, the President, Forrest G. Eddy, D.M.D., of Providence in the chair.

Reports were made by the recording and corresponding secretaries, treasurer, and chairman of the Committee on Clinics. This committee was appointed last March as an experiment, but since that time it has thoroughly demonstrated its usefulness, and has now become an important department of the Society. Six clinics have been given, five by members of the Society, as follows:

“Restoring to full contour an approximal surface of a bicuspid, using a steel matrix.”

"Showing several cases of practical bridge work."

"How to bake porcelain inlays."

"How to grind porcelain contours."

"The use of cocaine in the extirpation of the dental pulp."

"Method of burnishing gold in filling and restoring contours in an upper central."

The recording secretary reported the number of active members as forty-four and corresponding as thirteen.

The Society has held ten meetings during the past year, nine regular and one annual. Eleven essays have been presented, of which eight were contributed by members of the Society.

The December meeting was entirely devoted to the celebration of the "Semi-Centennial of the Discovery of Anæsthetics," and all members of the alumni were invited to be present, many accepted the invitation, and the occasion was most enjoyable.

An innovation was introduced this year by making the annual meeting "ladies night," and the response the invitation called out was very gratifying. After a social half-hour an adjournment was made to the banquet-hall, where forty-nine members and friends assembled. At the close of the dinner the orator of the evening, William P. Cooke, D.M.D., of Boston, held closely the attention of his hearers, taking as his theme "The Dentist as a Man."

The standard set by the orator was a high but not impracticable one. The dentist should make himself broad by a liberal education, seeking to train his whole mind just as the athlete does his whole body. The possibilities of the profession are great and the value of the work is in proportion to the service rendered.

A letter of regret from Professor Francis G. Peabody, D.D., of Cambridge was read, and also from Rev. W. E. Huntington, Ph.D., Dean, Boston University.

Interesting addresses were made by Mrs. Mary A. Livermore, Rev. W. B. Eddy, and John T. Codman, D.M.D.

The following officers were elected for the ensuing year: President, James Shepherd, D.M.D.; Recording Secretary, Waldo E. Boardman, D.M.D.; Corresponding Secretary, E. B. Hitchcock, D.M.D.; Treasurer, Dwight M. Clapp, D.M.D.; Editor, Henry L. Upham, D.M.D.; Orator for 1896, Edward S. Niles, D.M.D.

Executive Committee.—Waldo E. Boardman, D.M.D. (chairman), Arthur H. Stoddard, D.M.D., J. G. W. Werner, D.M.D.

JAMES SHEPHERD,

Corresponding Secretary.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE Twenty-seventh Annual Meeting of the above Society will be held in Academy Hall, 42 North Pearl Street, Albany, May 8 and 9, 1895. The subject for the meeting will be "Green-Stain," and divided as follows:

"The Etiology," illustrated with lantern slides, etc., by Carl Theodore Gramm, M.D., Chicago, Ill.

"The Classification," by W. C. Barrett, M.D., D.D.S., Buffalo.

"The Therapeutics," by S. B. Palmer, M.D.S., Syracuse.

Members of the profession are cordially invited to attend.

F. T. VAN WOERT, Brooklyn,
President.

C. S. BUTLER, Buffalo,
Secretary.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

It is earnestly requested of the presiding officers or secretaries of the Examining Boards throughout the States and Territories that they kindly forward to the National Secretary the full list of officers with their respective addresses.

In view of the large meeting expected at Asbury Park in August, the secretary desires to give every Board due notice in ample time, and likewise obtain a corrected list of officers to date.

CHARLES A. MEEKER, D.D.S.,
Secretary.

29 FULTON STREET, NEWARK, N. J.

ILLINOIS STATE DENTAL SOCIETY.

THE Thirty-first Annual Meeting of the Illinois State Dental Society will be held at Galesburg, May 14 to 17, inclusive. An interesting programme is in course of preparation. All dentists practising in Illinois are especially invited to attend. A cordial invitation is extended to the profession generally. This will be the first meeting in Galesburg since 1876, and it is the hope of the officers that it will be one of the most profitable meetings in the history of the Society.

LOUIS OTTOFY,
Secretary.

MASONIC TEMPLE, CHICAGO.

Selections.

THE VALUE OF PEROXIDE OF HYDROGEN PREPARATIONS.

THE following brands have been tested for volume of available oxygen, amount of residue, degree of acidity, and amount of soluble baryta salts contained therein, as per the following table:

Number.	BRANDS.	Volume of Available Oxygen, determined by Means of a Solution containing 5.065 Grammes of Potassium Permanganate of Potash per Liter of distilled Water.	Residue obtained from 100 c. c. of Peroxide of Hydrogen dried at 120° C.	Acidity expressed in Cubic Centimetres of Normal Volumetric Soda Solution for 100 c. c. of Peroxide.	Baryta found in Soluble Baryta Salts contained in 100 c. c. of Peroxide.
1	John Bene's Peroxide of Hydrogen, Medicinal	10.50	0.1886	2.19	None.
2	Hydrozone	27.35	0.2180	3.11	None.
3	Larkin & Scheffer's Peroxide of Hydrogen, Medicinal	9.65	0.1206	6.75	None.
4	Mallinckrodt's Peroxide of Hydrogen, Medicinal	9.55	0.1408	1.43	None.
5	Marchand's Peroxide of Hydrogen, Medicinal	16.55	0.5640	1.29	None.
6	McKesson & Robbins's Peroxide of Hydrogen, Medicinal	10.95	0.0540	0.44	None.
7	Merck & Co.'s Peroxide of Hydrogen, Medicinal	0.50	0.2418	4.57	None.
8	Oakland Chemical Co.'s Peroxide of Hydrogen, Medicinal	10.50	0.0382	0.34	0.0017
9	Peuchot's Peroxide of Hydrogen, Medicinal	10.60	0.4674	1.77	0.0018
10	Powers & Weightman's Peroxide of Hydrogen, Medicinal	8.40	0.0830	2.03	None.
11	Pyrozone, 3 per cent.	11.20	0.0534	0.76	None.
12	Rosengarten & Sons' Peroxide of Hydrogen, Medicinal	3.10	0.1002	0.25	None.
13	Smith, Kline & French Co.'s Peroxide of Hydrogen, Medicinal	6.15	0.0880	2.60	None.
14	E. R. Squibb's Peroxide of Hydrogen, Medicinal	12.40	1.0040	12.04	None.

By referring to this table it is easily understood that sample No. 2, "Hydrozone," is far superior to any other brand which has ever been made, not only on account of its containing a much larger amount of available oxygen, but also owing to the presence of a small quantity of several essential oils, the respective nature of which could not be determined, very likely because they have been submitted to the oxidizing action of peroxide of hydrogen before being used to make "hydrozone."

I attribute to this small quantity of essential oils the great superiority of hydrozone over any other brands of H_2O_2 as a healing agent.

When hydrozone is diluted with distilled water, in the proportion of half and half, the resulting mixture contains about 13.5 volumes of available oxygen, and its bactericide power still remains the same as the bactericide power of sample No. 5, which contains 16.55 volumes of available oxygen.

Acidity.—The fourteen brands which I have examined contain free acids (phosphoric, sulphuric, muriatic); and I must say that peroxide of hydrogen, medicinal, should never be made neutral before using, even in the most delicate cases. Neutral peroxide of hydrogen rapidly decomposes under all conditions of exposure.

The keeping properties of H_2O_2 solutions vary a great deal with the degree of purity and the percentage of free acids contained therein.

If the proportion of acid is too large, the profession well know that it acts as an irritant upon diseased surfaces. If it is too small, the solution don't keep well.

My opinion is that a standard solution of medicinal H_2O_2 must answer the following tests:

1. It should contain at least fifteen volumes of available oxygen.
2. The quantity of free acids contained in one hundred cubic centimetres should require not less than one cubic centimetre and not more than three cubic centimetres of normal volumetric soda solution, to be made neutral. Such a small quantity of free acid is not objectionable.
3. It should not contain any soluble baryta salts.
4. It must be free from sediment.

H. ENDEMANN, PH.D.,
Chemist.

NEW YORK.

THE International Dental Journal.

VOL. XVI.

JUNE, 1895.

No. 6.

Original Communications.¹

A METHOD OF INSERTING GOLD FILLINGS WITH THE USE OF HAND-BURNISHERS, AS PRACTISED EX- CLUSIVELY FOR SEVENTEEN YEARS.²

BY DR. HENRY F. LIBBY, BOSTON, MASS.

IN attempting to place before you to-night an experience covering so many years, I must necessarily begin with the earliest incidents, so that you may be familiar with all its motives and results.

Twenty-one years ago, Dr. W. H. Atkinson, of New York City, visited the Harvard Dental Infirmary for the express purpose of instructing the students upon the use of the hand-mallet for filling teeth with gold, and endeavored to prove that this method was the best for preserving them.

A few weeks later, Dr. T. D. Shumway, of Plymouth, Massachusetts, was introduced to give a clinic before the students of the same class, with an original method of using ivory points for "packing gold fillings," and claimed that this would give the best results in saving teeth.

At this early period of my chosen profession I stood face to face with two extreme advocates, involving great principles. Therefore

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the American Academy of Dental Science, December 5, 1894.

I concluded to visit Professor Thomas H. Chandler, of Boston, then instructor at the school, to see if he could not throw some light upon this mystery. I found him in a dilemma concerning these theories, but kind and glad to direct me to an apparently safe method to pursue. He advised me to purchase the Varney set of pluggers, and to use hand-pressure with cohesive gold; still, he considered the automatic mallet safe in experienced hands. After this interview I abandoned all thought of adopting Dr. Atkinson's opinions, and experimented upon infirm patients with ivory points that I made myself, copying as near as possible Dr. Shumway's, but introducing more delicate points to reach small and difficult cavities that we are constantly called upon to treat.

Here was where I lost all hope of Dr. Shumway's method becoming practical. The pressure required to condense the gold properly would break the point, and for contouring, the delicacy of the edge-strength of the instrument could not be relied upon, and I gave up its use altogether.

However, gentlemen, personally I give Dr. Shumway the greatest credit for the suggestion that gold can be manipulated without the use of serrated points, although he asserts that gold cannot be burnished with ivory points. To quote his own words from a paper on ivory points, read before the Massachusetts Dental Society, February, 1872,—

"Ivory points are not pluggers, but are designed for packing gold; they are not burnishers, for gold cannot be burnished with ivory; no instrument can be constructed that will admit of direct application in all sorts of cavities. A smooth-faced plugger, be it ever so carefully formed, if it be made of steel, will slip under the force necessary to consolidate gold-foil. A burnished surface is not favorable to aggregation."

Please pardon me for occupying so much time with these quotations, but I would like to have it understood in what attitude I stand with regard to Dr. Shumway's method.

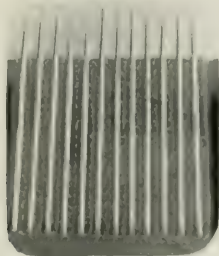
I am here to give the results of twenty-one years' experimental work, seventeen of which have been devoted to burnishing one piece of gold upon another with steel instruments until a filling is matured.

I was deeply impressed with the opinions of Drs. Shumway and Chandler, notwithstanding all the professors of the school at that time advocated the use of the automatic mallet. The next four years I experimented studiously with hand-pressure, using

Varney points and the automatic mallet. During that period I found a decided preference in hand-pressure.

Now I will show you upon the screen the instruments used during these years, and you will discover in these series of slides that the fundamental principle of success lies with the instruments.

FIG. 1.



In this set of Varney's pluggers (Fig. 1) the two most favorite points were this long and rather delicate obtuse foot-plugger, and its companion, a shorter foot-plugger. These I could manipulate with greater freedom in the incisors and cuspids than other shapes, using the back of the points as well as the face.

It was perfectly surprising how attached I became to this pair of points, and probably should have been operating with them to-day had I not discovered their incapacity to do better work. Possibly this feeling of sentiment arose from the fact that the rapidly-increasing confidence in the burnishing process began with these instruments.

It came about in this way: the slight serrations becoming worn by constant use, I found the gold during the packing process showed a burnished appearance, yet cohered perfectly by passing the instrument across the filling with an upward and downward stroke as the case required. This occurred during the latter part of the first four years of my practice.

The flat burnisher, commonly used after the filling is completed, followed these instruments. Here was the beginning of this method which gave me such anxiety that I shall never forget its burden.

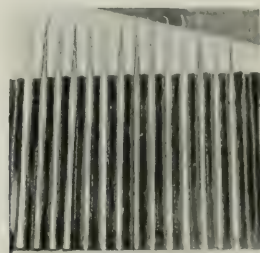
Yet how beautiful was the relief when my patients' annual and semiannual visits rewarded me with few failures. Where were these failures? at the cervical borders, and why? because the instruments were ill-adapted to reach this most vital spot.

The angles of the points were not compatible with the form of the cavity. The handles were too delicate to be held with sufficient

strength for condensing the gold properly. Hence, the impact was not perfect. Did the gold cleave or not cohere? No! why, then, these failures?

I was convinced that they were due to the instruments; therefore I purchased the Harvard set, which you now see (Fig. 2). Then I

FIG. 2.



began the use of the corkscrew form of points for burnishing, which has proved the greatest blessing to the patients' comfort and personal gratification.

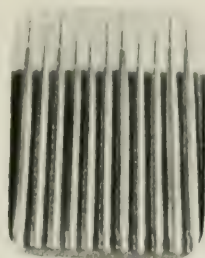
These are the forms that were chosen to perform the work of the next five years. I immediately began to improve upon the fillings of the incisors and cuspids after these instruments were introduced, which was evidence to my mind that the corkscrew form was an advance in these particular cavities. Now failures appeared at the cervical walls of the bicuspid and molars; the same unfortunate conditions existed here as with the Varney points,—the inadequateness of the instruments to reach the deep distal and mesial cavities of these last-named teeth; also the same difficulties appeared regarding the handles. I felt the necessity of getting more purchase near the point, and therefore the idea came to me of short-shanked instruments. It was then I began to make patterns of instruments and shape of handles as my experience seemed to demand.

The following (Fig. 3) will show how crude and clumsy was my first design.

The handles of steel were needlessly heavy, and tapered at an inconvenient place, yet they were an improvement upon the Harvard set. I operated with these for the next four years, using the obtuse, round points for packing soft foil at the base of the cavities of bicuspid and molars, and completing the fillings by burnishing

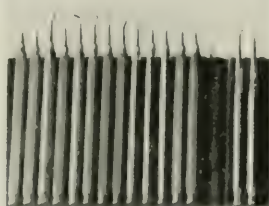
with a longer pair of corkscrew points, designed by Dr. E. E. Hopkins, of Boston.

FIG. 3.



With these points I was able to reach any desired depth, and contoured with these two flat obtuse burnishers. Now I have had an experience of nine years with this method. My success was established as far as cohesion of gold by burnishing was concerned, even under the difficulties that pursued me with imperfect instruments. However, I could not get close enough to my working point, even with this set, without great fatigue to my hand, and I saw the necessity of larger handles near the points. These were not practical in steel, and the thought of wooden ones came to me. I designed these instruments, with short shanked points, to enter a solid piece of metal that penetrated the handle. (Fig. 4.)

FIG. 4.



The matter of wooden handles and sockets is old to the profession, my modifications simply being shortening the points and shaping the handles to suit my taste.

I will not dwell upon this set, only to say that the hexagonal handles were a mere fancy which I regretted after practical use: the corners cut my hand and hardened the cushions of my fingertips.

The most important features were the introduction of very long

well-curved corkscrew points, varying in sizes. With the largest of these I was able to pack with ease and satisfaction soft foil at the cervical walls of molars and bicuspids. The success of arresting decay at this most vulnerable point with these instruments was assured after a test of four years, which I considered a proper length of time to test any gold work.

I had now arrived at a point where I felt the solid earth beneath my feet, and did not have doubtful thoughts when attempting the most difficult contouring, building out lost and broken corners, showing abraded and worn masticating surfaces, with perfect confidence.

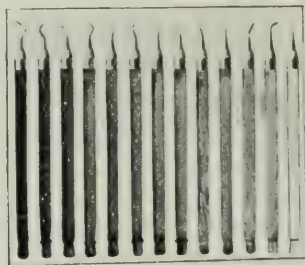
It is interesting to note that during all these years I have used only one manufacturer's gold, both in soft and cohesive foils, and by this method was better able to determine where the failures existed.

I was restless with these handles, and saw that the point could be shortened still more to advantage.

Before entering upon the last set of instruments I want to express my gratitude and thanks to Mr. Frank K. Hesse, manager of the manufacturing department at the Codman and Shurtleff house. He has been untiring in his efforts to follow out my wishes, and it is only with the patient care of such a person that we can accomplish our purpose.

If you can be patient, I would like to go into minute detail in describing the last results of this complete set of thirteen instruments, which I will pass around and also show on the screen.

FIG. 5



First, you will observe that the handles are round (Fig. 5), and a trifle larger than any yet shown. I found during these experiments with handles that a sensitive touch, firmness in grasp, and accuracy in manipulation increased in proportion as I enlarged them. Might this not go on to a greater extent? I think not; the

limit ceases when the cushions of the fingers can no longer vibrate with immediate contact with other portions of the hand.

Wood is pleasant to hold, light, and subdues a steely vibratory sound both upon the teeth and cabinet: I am adopting them both in excavators and gold-trimmers.

By its use we are enabled to select colors which will assist in quickly recognizing the points desired when they are thrown upon a bracket promiscuously, without tiring the eyes in searching for the smaller object, the point.

The butts of the handles point out at a glance the right from the left; and this simple suggestion assists materially in resting the eyes. I have searched carefully to get the most distinct colors, and out of all the varieties of natural wood have only been able to secure nine. Those at the right are ebony, then mora, leopard, and coccoloba. These are in pairs. The single ones are red cedar, mahogany, sycamore, and white holly, the last five having the same shaped butt, and are caught with the eye by the color only.

The cone-shaped ferrule that receives the point is a solid piece of metal; so shaped as to form a ferrule over the end of the wood, and the body extending for an inch and a half down the handle. This receives the point with a screw thread, and when turned in firmly never turns during the operating.

Before entering into the particular service of each point in the set, I will call your attention to a mathematical principle in shaping cavities that follows in our line of work with few exceptions. Let us look at this slide a moment (Fig. 6): these cuts are selected

FIG. 6.



from Dr. Ottolengui's and Dr. George Evans's methods of forming cavities; in these you observe that all the cavities and their retaining surfaces represent spheres or parts of spheres. This is true to the order of natural law for obtaining the greatest mechanical strength.

If we should take any normal tooth and divide it into sections, and continue its curves, we should form spheroidal shapes. In this figure (7) this corkscrew point likewise forms, by following its

FIG. 7.



peripheral curve, a sphere; the smaller circles that you see represent some portion of the point curvatures. You will also observe the form of bur I have used exclusively in my practice: these are round. Here we have three corrugated forms that apply to each other with sympathy of adaptability that coalesce strongly and practically. Let me now demonstrate the method of filling this tooth.

I will suppose that the cavity has sufficient retaining walls to hold a mature contour filling. At a convenient point at the cervical margin I should make a retaining groove; with a No. 1 round bur in this groove drill a pit for the starting-point, then fill it with hand-pressure until it is well out of the pit, and immediately begin to burnish piece after piece on its surface with the third pair of corkscrews; completing the entire filling with one pair of instruments only would be practical, but not necessary.

To increase the rapidity of the operation, after I was out of the retaining grooves, "which this point will follow with a nicety of adaptation that is very gratifying," I would complete the work with a flat burnisher.

Next, let me fill this upper or lower second bicuspid on the distal surface. (Fig. 8.) I should use crystalline surface soft gold-foil, No. 4, cut each sheet in thirds, roll into rope form between the thumb and finger, making a cylinder; this I pack in each side and key in the centre.—a very familiar practice with you all.

This would be condensed by the use of the same form of corkscrew, only two sizes larger, and deeply curved so as to reach any cavity in the mouth. These are used for packing soft foil, and are finely serrated to prevent slipping and to assist in the mechanical union that exists between unannealed and annealed foil.

You will picture in your minds the soft foil covering the cervical wall, and reaching up far enough to protect the danger-line where the enamel ceases. I only use one layer of soft foil.

FIG. 8.



I begin at once to anneal my foil, or any form of gold that is, as we term it, cohesive, and pack with hand-pressure along the right angle at the wall protecting the pulp. I have no difficulty whatever in starting my work here, and wonder at it myself.

I have now proceeded far enough to use the second size of corkscrew points, and begin to burnish the gold into the under-cuts down upon the soft foil, which stiffens the cervical body, and the polishing up and over the walls of this fragile portion of enamel surface with a comfortable reliance that has relieved me of all anxiety of its becoming disintegrated during the process. I continue with this point until I wish to begin to contour, when I would use a flat obtuse burnisher, the surface of which is at right angles with the handle, building the contour to any desired form or delicacy without having the least trepidation concerning its cleaving or breaking away.

The mesial cavities are filled in like manner, except that a foot burnisher is used for contouring.

The molars, bicuspid, and distal surfaces of cuspid are manipulated with these instruments.

In leaving this part of the topic I will show the improvements upon the size of handles and short-shanked points, and simply say that I cannot recall any instance where the large handle and short point interfered by being in the way while operating. (Fig. 9.) The other accessories necessary to complete the outfit for this form of working will be shown in this slide. (Fig. 10.) A doily is placed upon a bracket from which I pick up the gold for annealing, using the same burnishing point for that purpose, and the temper

of the instrument has not suffered any loss by being used in this way.

FIG. 9.

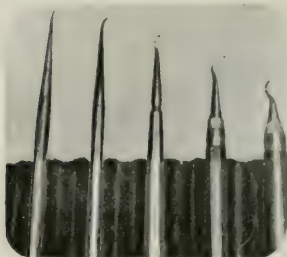


FIG. 10.



The gold here represented is No. 3 foil, rolled in rope form and flattened out by passing a round-handled instrument across it. This is done simply to facilitate in passing it to the cavity, and does not diminish the cohesive quality. This flat piece is a serrating file, to assist in keeping a roughened point surface that is necessary for picking up the gold. Passing the file across the point of the instrument is sufficient to make the gold adhere to it. This disk holds a piece of crocus paper, which is used for polishing the burnisher; occasionally it adheres to the surface of the gold.

I have never been able to analyze this problem, and have questioned Professor C. R. Cross, electrician at the Institute of Technology, regarding it, and experimented along his line of thought without discovering any electrical disturbance.

The next important of all the appliances is this alcohol-lamp (Fig. 10), which I purchased at the dental depot. The shield was made for me, as a broader and larger protection was required for the flame; the inner surface being blackened so that the flame could be discerned more quickly.

I have annealed upon metallic trays with perfect safety, using gas, but never over a Bunsen burner.

Upon this matter let me use the words of Professor G. V. Black in his paper read before the New York Odontological Society.

"Gold-foil possesses the power of condensing or occluding gases and volatile substances upon its surface. That when such gaseous occlusion took place the welding property was entirely destroyed. In view of the readiness with which gold-foil absorbs gases, the use of a naked flame for annealing gold-foil is objectionable, for the reason

that the foil is subjected to the action of the products of combustion, which in the case of a Bunsen burner contains, besides the usual water and carbonic acid gas, a greater or less amount of sulphurous anhydride, and should the imperfection of the combustion be in any way modified, acetylene and other deleterious hydrocarbons are produced." He further states, "If a naked flame is used, ninety-five-per-cent. alcohol, with asbestos wick, is the least objectionable."

This analysis of Professor Black is practically substantiated by Professor Thomas Fillebrown in his work on "Operative Dentistry," and he approves of annealing by the use of the alcohol flame. I have not discovered any objection in the use of the alcohol flame, passing the gold through it or a little above, being not over particular in this matter; sometimes it reddens and melts at the extreme thin portions, but it all welds, and the work goes on without disconcerting me in the least.

There is one more important device that I use for repairing gold filling. (Fig. 11.) This shows a glass tube that is packed with

FIG. 11.



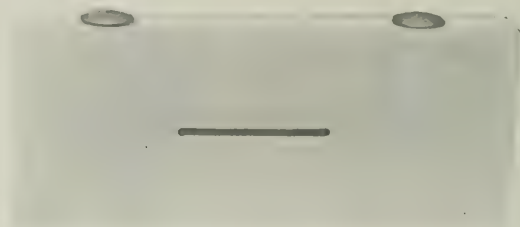
cotton and saturated with alcohol, and when lighted the flame can be attenuated to any desired length, and at any angle, by the use of the chip-blower.

In undertaking to repair a gold filling, and after the surfaces are cleansed, I flash the flame across the surface to insure perfect safety. However, it is not as necessary in burnished work as in other forms of gold work, as it is less porous.

Now, dismissing this part of the theme, I will ask you to follow me through a series of experiments, taking up the various methods of manipulating gold, each having its admirers and advocates. On this slide (Fig. 12) is shown a block of ivory three inches long, two inches wide, and one-half inch thick, which is constructed in two sections, which are bolted firmly together at each end. In the centre you observe a fissure one inch long, with a depth sufficient to admit a pear-shaped finishing bur. Being impressed that if necessary caution were used I might arrive at some conclusion regarding their characteristics.

To follow out this thought by a practical test, Dr. Thomas B. Hayden kindly assumed the responsibility of filling the fissure.

FIG. 12.



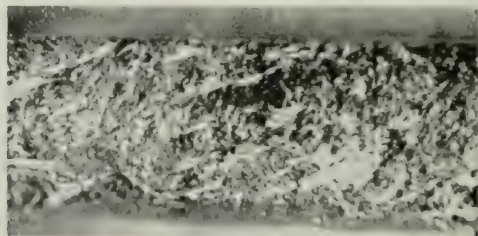
My object in choosing him is that he was fresh from the hands of his instructors at the Harvard Dental School, and had not acquired any one method that would prejudice him.

In every case Dr. Hayden employed one manufacturer's gold, using No. 3 cohesive foil, rolled in rope form, with sheets divided in thirds. He began the work at the extreme end and continued in a diagonal manner until it was completed. The time was carefully noted, and his own good judgment dictated his procedure.

The six methods that he took up were labelled and submitted to the microscopist, Mr. H. S. Smith, who used every endeavor possible to produce the best results.

Those of you who have had any experience in photo-micrography will appreciate the difficulties that arise in trying to procure a comparatively clear positive from an opaque, reflecting object, and will acknowledge, I think, that he has been able to show very distinctly the imperfections of our gold work. We will

FIG. 13.

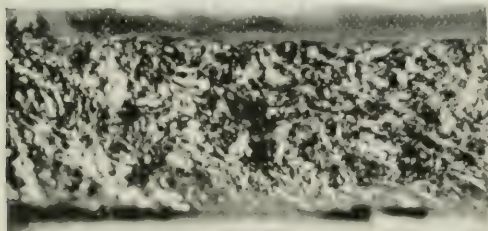


begin with the hand-mallet. In all of these slides you will discern light and dark patches representing the portions of the cavity that

have been perfectly and imperfectly filled. This, I will admit, looks formidable, but if you comprehend the magnification being so great we will forgive the disclosures and the inventor of these powerful lenses.

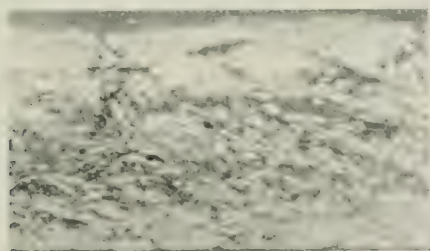
In making this bar, Dr. Hayden used a Harvard foot-plugger, and I an eight-ounce lead mallet. The time required for filling this fissure was one hour and twenty minutes; weight, twenty-one

FIG. 14.



grains. In our next exposure of Dibble's pneumatic mallet, we meet with deeper depressions, an indication of less density, yet it shows an interlacing of its molecular structure that is interesting. Time required, one hour; weight, ten grains.

FIG. 15.

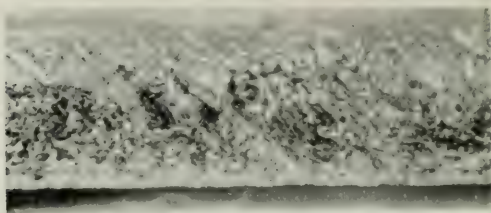


In this we represent the work of the Snow & Lewis automatic mallet. Here we have a very decided improvement over the hand- and pneumatic mallets, the texture more homogeneous, a quality that we are seeking for.

The fissures, or what is commonly called rat-holes, are less pronounced. Its contact with the surface of the cavity patchy, but comparatively good. Time of filling, two hours; weight, fourteen grains.

The work of the Bonwill mechanical mallet now appears upon the screen, representing a similar appearance, not quite so badly

FIG. 16.



distributed in masses as the automatic, otherwise apparently very dense in structure. This was filled in one hour and five minutes, weight twelve grains.

FIG. 17.



The next to follow is the hand-pressure. We are to judge of its merits through the centre, as we focussed at the most desirable portion of the bar.

After what has been discovered already, we are prepared to see a porous structure, with pits showing that serrated instruments produced them, and a cohesive interweaving of the lamina of gold.

FIG. 18.



Time of filling, one hour and thirty-five minutes; weight, thirteen grains.

The next illustration shows the burnishing method. In this we have less deep cavities and pits, more fibrous in structure and a surface adaptability, for which we are aiming. Time of filling this was one hour and thirty-five minutes; weight, fifteen grains.

FIG. 19.



The accompanying slide shows the result of my work under the same conditions; it is very gratifying to witness such results as you see. It has a fibrous appearance, homogeneous density, and adaptability that we would expect if a plastic material were burnished against dense walls.

What have we learned by this analysis? first, that the hand-mallet pounded more gold into a given space than any other method, and yet its object of condensing against its walls was far from being perfect.

In connection with this result, let me quote Dr. Ottolengui from his book on methods of filling teeth. These are his words: "The theory was that the more gold one could crowd into a cavity the better the result." He says this is not true, and states also the supreme demand upon any filling is "that it shall present a durable surface, and be in close contact with all its walls." I am convinced that he has the sympathy of the fraternity in this matter.

Of the Dibble pneumatic mallet you have already formed your opinions of its structure and weight.

The automatic mallet is the universal instrument for filling teeth. What physical phenomena do we observe under its treatment? In your gold work of all descriptions you have discovered an inherent propensity of the metal for becoming hardened and tempered, by hammering or malleting. In our laboratory work we redeem the soft elastic quality by repeated annealing.

Can we do this in malleting in a gold filling? Certainly not. Then what happens? We are constantly tempering and hardening the mass, making it more obstinate in conforming to our wishes, less elastic and fibrous, and less suited to our needs, as the slide plainly shows deep pits and grooves against its walls. Is the

tempering and hardening a desirable feature towards perfect work? To my mind it appears only for one purpose, that of giving strength, an acquisition not to be ignored, but to be supplanted by a more humane and satisfactory way.

The references I make regarding the Bonwill mechanical mallet are from experienced operators. "Dr. Louis Jack refers to it as being rapid in movement, and that gold can be packed with great rapidity, and with very considerable density. The complaints of patients after they become accustomed to the great velocity are less than in most forms of effectual malleting."

"Dr. Ottolengui prefers it to other mechanical devices for operating, and the comparison he makes of patients' choice between the use of this and the hand-mallet is that fully ninety per cent. choose the Bonwill."

To solve the problem of hand-pressure I take great pleasure in referring again to Dr. Ottolengui, as I deem it a duty to those who are listening that an authority should be adopted that has had, as it appears, an unbiassed experience with all gold work. You will easily see that my knowledge is worthless in individual practice with any of the accepted methods. Therefore I will repeat after the doctor in his paragraph, "How to condense Gold." "The greatest good gained by hand-pressure is that gold remains more cohesive under this method than in connection with any other," saying "that he had sufficiently tested it to feel safe in making the following dogmatic statement: the more gradual the pressure exerted upon gold-foil, in condensing it, the less it loses its quality of cohesiveness, and, *vice versa*, the more sudden, sharp, or rapid the blow of the hammer, the less cohesiveness will be exhibited."

This whole chapter on "Gold as a Filling-Material" is deeply interesting. Referring to this case again, we place alongside of these remarks the observation revealed by the microscope, noting its texture and weight, and there must leave it with its admirers.

In taking up the methods of burnishing or welding gold, I find several very able writers who have touched upon this theory with a mystifying sense of doubt and temerity which has impressed the professional brotherhood with awe and hesitation. For instance, one of your very distinguished members, Professor Fillebrown, in a paper that was published in 1873, entitled, "Another Method of packing Gold," describes very minutely the details that are necessary to achieve success with smooth steel points, stating that the manner of applying the force must be a steady pressure with only a slight turn of the point; any rubbing of the gold must be avoided;

it destroys the cohesiveness of the surface so that more cannot be added.

Would not directions of this kind alarm any operator, and make him cling all the closer to his early teaching? Dr. Ottolengui has resorted to the burnisher for contouring when teeth have become sensitive from prolonged malleting, with satisfaction to his patients and to himself; and he impresses you that you should not proceed any further.

Dr. Herbst used burnishing points, rotating them with an engine. Dr. Frank Abbott found no difficulty in cohering gold with smooth points.

Doubtless there are many in this audience who have burnished gold in some degree; and why is it to-day that dentists are afraid of undertaking this simple method of working gold? I think three words will explain it,—unsuitableness of instruments.

I have been unable to find any reliable information or reasonable excuses for not using suitable smooth steel points for inserting gold fillings by a burnishing process.

Now that the microscope and test of weight permit me to show enthusiasm without the appearance of egotism, you will allow me to speak freely. What has it done for me? First and foremost, my patients are benefited; their sufferings are lessened to at least one-half of the usual pain.

When the cavity is prepared the pain ceases, comparatively speaking; and what does this mean in itself? That I have patients from distant cities visit my office for the more difficult gold work, which they know can be done painlessly and satisfactorily. Furthermore, many delicate teeth filled with cement and gutta-percha have been treated successfully; likewise, a great number of fillings with discolored margins have been restored for better adaptability of gold to their frail enamel walls. Teeth that have been given up as lost are restored to beauty and usefulness.

In comparing notes with other operators I find another advantage in this very simple method that is prized both by patient and operator; the rapidity of the work is increased at least one-third. You all know the meaning of the distribution of forces, how the molecular structure of a tooth takes it up and passes it along, or if its impact becomes too intense, that it disintegrates the enamel prism.

It is understood by you all how sharp concussion acts upon any solid body, and you cannot fail to see that the same force applied slowly will be redisturbed without injury. I speak of it as being a

simple method. What appears to be difficult about it when once you have the confidence I am unable to discover.

It is not necessary that you should have the instruments that have been shown you to-night. Improvise the flat burnisher,—any corkscrew, foot-point, or broken excavator. However, I would consider the handle, for it does require a comfortable amount of force to condense gold properly; pick up your gold with the point and anneal with it; as I said before, my gold rarely adheres to the point, possibly because it passes through the alcohol flame.

Spend a night or two experimenting, and you will be convinced that it is simple, trustful, and practical. After all this enthusiasm, the question may be properly asked, Why have you not let the profession learn of this before? I will tell you. First, I had not completed my experimental work with the instruments until within the last few years. Secondly, an opportunity which I deemed appropriate had not presented itself. I realized what it meant to the human family. I knew what it meant to the operator.

I dared not move until I was surrounded by encouraging sympathizers. This anxiety and doubt I explained to my friend Dr. Gerrish, of Exeter, New Hampshire, who urged me to show what I was doing. This was two and a half years ago. Still I hesitated; until meeting your president, six months ago, while talking the matter over with him my duty was made clear. He well knew the fear was due to the fact that there would be little good gained unless I had supporters to help establish its claims, and I would gladly have deferred this privilege even longer were it not for his kind entreaties.

Gentlemen, I knew eight years ago that I was having an experience worthy of consideration. I knew it possessed a merit and a quality that humanity is suffering for, and my motive for waiting was a far-reaching one; it enters the homes of a multitude of sufferers who do not visit us, having thoughts of our treatment. Then let us not be content, but try and inspire our patrons with the assurance of our sympathy and best endeavors.

THE SCIENTIFIC SPIRIT AND THE ETHICS OF DENTAL PRACTICE.¹

BY DR. C. J. ESSIG, PHILADELPHIA.

"THE individual," some one has said, "is a puzzle; in the aggregate he becomes a mathematical certainty. You cannot foretell what one man will do, but you can say with precision what an average number will be up to." In no calling is this more conspicuously true than in the dental profession; its rapid advancement, its triumphs and scientific spirit, very justly entitle it to the admiration and pride of its members. Yet among dentists it is often asserted that there is no *esprit de corps*, and the frequent instances of disregard of the code of ethics on the part of individuals, and the unscientific spirit in which many of them view the lesions of the organs which it is their specialty to treat, make a bold contrast between the high aims of the profession as a whole and the practice of a large number of its members.

In our societies, current literature, and colleges, in the free and liberal professional intercourse which has been steadily growing for more than a generation, may be found the most gratifying improvement over the time when the tendency was to conceal every invention, device, or detail of practice, as the miser does his gold.

It cannot be denied, however, that *esprit de corps*, which is the "chivalry" of professional life, is often forgotten, and the code of ethics which should be our guidance in all intercourse, both with patient and professional brother, is as often ignored as observed. Yet we should be far from attributing every violation of the strict interpretation of the code of ethics to a want of honor or to greed; much of it is no doubt due to absence of the scientific spirit, which should guide the practitioner in the treatment of the dental organs.

The word "scientific" is often used by dentists in their writings and discussions, and they not infrequently misapply the term. Dentistry as practised is an art, even when the practitioner considers his filling-materials as therapeutic agents, therapeutics being itself essentially the art of medicine. A science teaches us to know, an art to do; with the light, then, which a knowledge of the so-called medical sciences sheds upon what we do, our work should be better done, and with greater uniformity in methods and results,

¹ Read before the Academy of Stomatology, Philadelphia, April 23, 1895.

than has yet been attained in the prevention or treatment of dental caries.

The remarkable want of concordance in diagnosis and in treatment in dental practice; the absence of *esprit de corps* and indifference to the ethics of questions of judgment between dentists, especially when, as is too often the case, the patient is made a party to controversies growing out of difference in treatment, has undoubtedly been a serious injury to our profession in the estimation of the public. The dental profession cannot hope to gain or to hold the highest respect of the people while its individuals exhibit the ethics of the artisan.

This fault comes to us from a variety of causes; primarily we get it as an inheritance from predecessors who flourished previous to the advent of dental colleges; they were often mere mechanics, without knowledge of the medical sciences, and their unwritten ethics were those of the artisan. Another cause may be found in the fact that filling teeth with gold is artistic in character, requiring the artistic instinct in its performance. The practitioner is thus lured from the scientific aspect of his specialty, which otherwise might stimulate him to find, in the realms of preventive medicine, lines of treatment of a higher order than the merely mechanical and often unsatisfactory one of filling carious cavities with gold, amalgam, or the "plastics." Another cause, which is now happily growing less every year, may be found in the fact that many recruits enter the ranks of the dental profession after having passed a portion of their earlier lives in commercial pursuits, and they bring with them the ethics and ideas of the shop, where the ability to sell often consists in the power to underestimate the wares of a rival. Such men are not likely to get beyond the idea of mechanical achievement in the treatment of dental organs.

Every dentist owes something to his profession, which freely lays its treasures at his feet, and if he is not endowed with sufficient self-respect to avoid practices which will dishonor him, he should be compelled to respect that profession whose sheltering wings include him in their fold, and whose fair fame may be smirched by every mean act of his professional life.

I was asked not long since, by a legal gentleman, the question, "Is there no *esprit de corps* in your profession?" Said he, "A relative of mine whose teeth had just been examined by a dentist of high standing, and pronounced in good order, called upon another member of your profession in a neighboring town, who claims to have found a large amount of work to be done, and has so shaken

the confidence of my relative that he and some of his family have left their family dentist." Now, said he, "If this incident merely indicates an honest difference of judgment, then there must be some serious defect in your system of professional education; but if this difference of opinion is, as I suspect, actuated by a commercial spirit, there should be a penalty made to follow such unprofessional conduct severe enough to make it unprofitable for him to repeat it."

I have heard incidentally of a case which occurred recently, of a dentist who made an examination of fillings done by a previous dentist in the presence of two of the patient's relatives, pointing out alleged defects, and using other arguments to destroy the confidence which they felt for many years in their family dentist. I was asked by the lady who related this circumstance to me, "Does your profession allow such conduct?" I replied that "our profession prescribed for its members a code of ethics for their guidance, but that no written 'code' could make a gentleman of an individual who was not so naturally or by training."

A gentleman asked me recently for an opinion about the case of an acquaintance who had his teeth examined by a dentist who told him that it would take six weeks to put them in order; he kept appointments every day for three weeks, when, getting "a little tired," he asked the dentist how much more remained to be done, and was told, "I am about half through." "Well," said the patient, "I think I will stop for a while." But soon after that he had occasion to consult another practitioner, who, after an examination, told him, that with the exception of trifling repairs needed in one tooth, his teeth were in perfect order. I prefer not to characterize this remarkable difference of opinion, but presuming that the incident was one of an honest difference of judgment between two professional men of equal intelligence, skill, and training, how may we account for such diagnostic uncertainty. The public is, I believe, more and more coming to attribute such differences to the commercial spirit, and thus our profession is, to a certain extent, made to rest under a stigma.

Viewing dentistry as a branch of the healing art, examinations made to determine which teeth are carious and in need of treatment correspond to diagnosis in medicine, being, however, much simpler in character and easier to determine; yet medical diagnosis has become almost an exact science, while dental diagnosis, among a very large number of educated and prominent individuals often making pretentious claims to high professional attainment, remains

so uncertain that it must inevitably bring distrust and ridicule upon our profession.

An example of individual disregard for professional ethics, and of the greed which often overrides every other consideration, was related to me by one of my patients, who stated that her sister's dentist had removed every filling in her mouth done by her two preceding dentists, and is now removing his own fillings.

The use of gutta-percha and other plastic filling-materials affords the unscrupulous individual his best opportunity for unprofessional criticism. A dentist who has been in continuous practice for more than half a century recently remarked to me, that "the most discouraging feature which he had met with in practice was to be found in those cases in which he had endeavored to save the soft and inferior teeth of early childhood by filling with gutta-percha and other plastic materials, and just when the age had been reached when sufficient improvement in the quality of such teeth seemed to warrant the use of gold with some degree of permanency, they would fall into the hands of some other dentist, presumably through loss of confidence in the family dentist; for some patients think that, unless gold is used from the first as a filling-material, we have not used our best efforts, and will seek the services of some one else, who, perhaps, will be only too ready to encourage the waning confidence in his professional brother. It is in just such cases that the individual finds his most prolific opportunity; he gets a patient of fifteen or sixteen years of age, in whose mouth, during early childhood, the teeth were of the frailest character, in some cases, perhaps, showing decalcification of the enamel on the labial surfaces of both upper and lower incisors. No class of cases cause the earnest practitioner more anxiety than do these; it would seem almost like malpractice to attempt to bridge over that precarious period of early dentition with any other of our too few and often unsatisfactory filling-materials than gutta-percha. But if the patient is unlucky enough to get into the hands of a man who habitually ignores the ethical side of cases, he frowns, looks unutterable things, condemns the earlier treatment, and fills with gold, the very thing the family dentist would have done at that time had the patient remained in his charge, for, by the fifteenth to the seventeenth year, the teeth often show great improvement, and sometimes the tendency to decay at that age will have entirely disappeared.

Ten years ago one of my young patients, who had teeth of the frailest character, so frail, indeed, that up to his fourteenth year I

believed that I could better arrest the progress of decay by the use of gutta-percha, got into the hands of a dentist at one of the fashionable watering-places, who, between himself and his assistant, after much severe and out-spoken criticism, replaced all the gutta-percha fillings with very inferior gold ones, yet that individual has, I believe, on more than one occasion publicly advocated the use of gutta-percha as a preliminary filling-material in "children's teeth of the frailest class."

Three or four years ago a striking instance of individual disregard for the code of ethics, which our profession prescribes for its members, came to my knowledge in the case of a young miss whose teeth were of very inferior quality, and for whom, up to her fifteenth year, I did not dare to use any other filling-material than gutta-percha. Having some discomfort with a very frail upper molar, she was taken in my absence, during the summer vacation, to another dentist, who extracted the first molar, and with many expressions of horror hastened to replace with gold what gutta-percha fillings he found in the front teeth. Now, it happened that in this case I had special reasons for wishing to preserve the first superior molar on account of a flat appearance of the face, which I feared would be greatly increased by the loss of that tooth, but when I again saw the patient in the autumn the mischief had been done; the scientific idea which should have governed in the treatment of the case had given place to the spirit of greed. The loss of the molar tooth, with the subsequent increased flattening of the face and the change in the centre line, was a matter of much regret to the child's parents, who were in no way responsible for the unwarrantable interference of the dentist, to whom the child was taken for some trifling repair to the tooth which was extracted.

Seventeen years ago I made an examination of the teeth of a lad of nineteen. I found a full denture of superior quality without caries, and so informed the boy's mother, at which she expressed surprise, and told me that within ten days her son's teeth had been examined by a dentist who recorded, as a result of that examination, "twenty small cavities." That patient is now thirty-six years of age. I have examined his teeth every six months since, and he has at present only two small gold fillings in his mouth. In this case I would not like to attribute the defect in the first diagnosis to other than one of judgment, but the patient becomes, necessarily, a party to the question, and whether the verdict of the public is that such remarkable differences are merely matters of opinion or

exhibitions of the commercial spirit, the effect is equally discrediting to the dental profession as a whole.

Now, it may be asked, Have you not overestimated this matter? Have you not cited a few exceptional cases? And do not other professions do these things too? I believe that violations of the code of ethics are practised to a greater extent than I have herein pictured. I have not selected as examples of this disagreeable feature of our profession a few exceptional cases. I have presented what I believe to be a few typical cases of practices which we all know do exist.

It cannot be denied that other professions have their "black sheep," and that habitual violations of the "code" to a certain extent is practised in the medical profession, but it is not as outspoken or as flagrant, and is confined more to the lower stratum of its members than it is in the dental profession, and is more severely dealt with when detected.

I imagine the remedy for abuses which have doubtless greatly retarded free and full association among dentists, and to a certain extent lessened the confidence of the public in our profession, will be found not so much in the arraignment of individuals as in improvement of methods. We still estimate gold as the best material for filling teeth, yet it is a significant fact that the best examples of gold fillings are seen in the teeth of young adults or those who have passed the age when fillings are most imperatively needed, and that gold is often the most unfit material with which to arrest caries of the frailest teeth, particularly those of early childhood, at the very time when effective measures are most demanded.

Neither from the prophylactic nor therapeutic stand-points has dental caries been sufficiently studied as a disease. Dentists have been so engrossed in the artistic treatment of the teeth, and the development of mechanical appliances, that a rational systemic treatment has been almost entirely overlooked. Caries of the teeth may with as much propriety be considered a disease as is "Bright's" or any other lesion affecting the different organs of the body, yet any of these may be controlled or cured by medicinal or hygienic treatment.

A properly regulated diet, with systematic physical exercise for the purpose of promoting assimilation to the extent demanded by nature for a normal condition of all the organs of the body, would do much to control and even cure dental caries. Many of our young patients have really no physiological right to have teeth, so perverted are the nutritive functions of their bodies. Does it not,

then, seem that a more rational treatment would consist in a hygienic system which would so build up the tooth-structure that it would be capable of retaining the mechanical stoppings over which we spend so much time, skill, and patience, and that would reduce the chances of a recurrence of caries to a minimum?

In the fact that the field-hands among the Southern negroes have exceptionally fine teeth, while the house-servants show rapid deterioration of the dental organs, and in the superiority of quality of the teeth of the laboring classes of Europe over those of the non-laboring residents of cities, may be found significant and useful hints in the treatment of these organs.

In addition to a well-thought-out systemic treatment, a filling-material is needed which shall require less time and skill in its application than does gold, and which, when applied, shall possess the qualities of impermeability, insolubility, and a close resemblance to the enamel and dentine of the natural tooth; be non-conductive of thermal changes, and, above all, one that can be inserted in a plastic state, with the ability to fully harden afterwards.

That both of these improvements in the treatment of diseases of the teeth will eventually come I do not for a moment doubt; and when it does, the scientific spirit will, it is to be hoped, take the place of the idea which leads so many dentists to believe that a well-finished gold filling is *per se* the highest aim of conservative dentistry.

PLASTICS AS A BAR TO BACTERIA.¹

BY JOSEPH HEAD, M.D., D.D.S., PHILADELPHIA.

"THE perfect filling must be water-tight," so says the time-honored axiom.

But a tooth is everywhere permeable by moisture, as can readily be demonstrated by dropping it, when dry, into aniline ink. It will be stained through and through.

One can hope to put a water-tight plug into a wet sponge quite as readily as into tooth-structure that is moist throughout. Thus we find that neither the axiom nor the filling will hold water.

Should we not rather say that, though a filling leak, it may still be perfect if it exclude germs of decay?

¹ Read before the Odontological Society of Pennsylvania, January 12, 1895.

On superficial observation it might be thought that wherever moisture could penetrate so could bacteria; but this does not seem to be the case, as bacteria have not yet been found in normal dental tubules.

Before decay can take place some free acid must first decalcify the enamel and the orifice of a tubule. In this enlarged opening the bacteria may enter, when devouring the gelatin it excretes acid, which, dissolving more of the lime salts, allows the germ to penetrate farther in (Sudduth).

The ideal filling would be composed of a material that is water-proof, bacteria-proof, adherent, and a non-conductor of heat. And, moreover, a material that can readily be placed in the cavity without the slightest danger of marring the enamel edges.

With such a filling in position, the tooth would be as likely to decay as it was before decalcification occurred.

But we have not yet found the ideal filling-material.

Gold, while it can be made to exclude bacteria from its own substance and from entrance at the edges of the filling, is a good conductor of heat, and can only be sufficiently hammered to make a perfect seal in teeth of dense structure. There is no doubt that gold can be made water-proof, as the Bonwill mallet has demonstrated time and time again. Teeth have been partially contoured one day and completed the next, perfect welding having been accomplished after the thinnest film of the moistened gold has been removed. But soft-foil fillings that have such a record for preserving teeth have been put in under water with lasting results. Does this filling preserve the teeth by starving out the micro-organisms? This supposition can hardly hold, as soft-foil fillings have been removed from cavities in a punky, evil-smelling state by means of the explorer, and the dentine beneath appeared sound and dense.

Tin would seem pervious to moisture, as any old filling can readily be separated into portions that only partially adhere. It has not been proved, one way or the other, whether it admits bacteria; but at least it can be said to preserve tooth-structure in a manner very similar to soft foil.

Amalgam in itself is water-proof, but leaks at the cavity margins.

Each year we hear of some wonderful alloy that will not shrink from the walls; but, in my opinion, that amalgam has not yet been discovered.

Reducing the mercury to a minimum will do much, but it has

been my experience that amalgam fillings of my own and those of my fellow-practitioners all show some slight shrinking from the enamel after the space of some five or six years. But even granting that all these fillings had been badly put in, we still find, when the bulging edges have been trimmed, that in spite of a palpable leak in many instances the cavity remained sound. It may be affirmed that metallic rust gets into the tubules and protects them. That is certainly some sort of an explanation, and yet it can hardly be accepted as conclusive.

Oxychloride of zinc and oxyphosphate of zinc, although adherent to the tooth walls, are readily penetrable by moisture and bacteria.

Gutta-percha, although practically if not absolutely impervious to moisture, invariably leaks at the cavity margins.

My experiments with gold, tin, and amalgam are not yet completed, and so it is possible only to deduce from facts that are clinically well known; but the assertions just made concerning the cements and gutta-percha seem to have been proved in the following manner.

Cones of oxychloride of zinc and oxyphosphate of zinc were made, having a hollow place within that was absolutely excluded from the outer air. Harvard and Peirce's oxyphosphate of zinc was used that became hard as ivory. Some of the oxychloride of zinc cones were made from calcined powder, some from the uncalcined. Those made from the calcined powder became extremely dense.

These cones were sterilized in a steam bath by the intermittent process in the following way: First, they were boiled in water two to three hours; then removed from the bath and placed in glass jars, the mouths of which were closed with absorbent cotton, and subjected to steam over the water-bath for one hour.

They were then allowed to cool for seven hours in an atmosphere of about 70° F.; again subjected to steam for one hour, and cooled over night. Next morning again heated for about an hour. Allowed to cool eight hours. Four hours steam heat, twenty-four hours to cool; one hour steam heat, allowed to cool, and then placed in a bath that after being first sterilized had been tainted with a decayed tooth. At the end of five days' immersion they were taken out and opened. The bouillon had filtered through the substance to the hollows inside. The bouillon found within was swarming with micro-organism.

The steam bath did not have the slightest effect on the oxychloride of zinc, but the oxyphosphate, from being very dense,

seemed much softened. This might seem to depreciate from the value of that particular experiment; but it would still seem probable, if the micrococci could pass through strong oxychloride, that they could also pass through the oxyphosphate, that is so similar to it in substance.

On drying the opened oxyphosphate cones, small, shiny crystals lined the inside, which looked not unlike free phosphoric acid that had not become chemically united with the powder. And yet the cones before boiling were extremely dense.

The experiments with gutta-percha were as follows: Three canine teeth were taken and opened from end to end. The surfaces of the canals were thoroughly drilled away. One end of each was filled firmly with gutta-percha. A small pellet of cotton soaked with sterilized broth was then placed in the canal. The remaining openings were then dried and filled with gutta-percha. These were sterilized as follows: Two and a half hours in steam bath, four hours to cool, one hour in boiling water, two hours in steam bath, seven hours to cool, two hours in bath, two hours to cool, and placed in tainted broth for five days.

At the end of that time they were taken out, dried, and passed rapidly once or twice through a Bunsen flame. The gutta-percha was then removed with a heated instrument, the cotton was taken out by tweezers previously sterilized in the flame, placed on a clean glass slide, and wet with two drops of distilled water. This water was then found to contain large numbers of bacteria.

If these facts are so, and the evidence would seem to indicate that they are so, what becomes of the fundamental principle involved in the statement that the edges of a filling must be bacteria-proof.

We know that cohesive gold fillings are almost if not quite certain to admit decay if the edges are not thoroughly tight. Then necessity for bacteria exclusion would seem not to entirely hold in the case of soft foil.

It may or may not be necessary with tin. It certainly is not absolutely imperative in the case of amalgam. With cement and gutta-percha it also does not seem to be an essential to tooth preservation.

And yet all of these filling-materials save teeth, and save them well. Especially is it the case with cement and gutta-percha, that stop decay when nothing else will. These last preserve the cavity walls, and yet allow the bacteria to enter. This seems a paradox, and is difficult to explain. One might say that bacteria need air

and food; that cement and gutta-percha shut the germs off from these necessities, and thus render them dormant. But this does not to my mind reveal why some soft, spongy, malodorous soft-foil fillings have preserved the dentine beneath from further decay.

The experiments just reported may seem to be a means of deducing new and startling facts, but in reality this is not so. Soft foil and amalgam foreshadowed these conclusions many years ago.

I should like to add one word for those who shall ever wish to sterilize teeth for bacteriological research. Do not do it in a vulcanizer under steam pressure. I placed fifteen teeth carefully prepared in a vulcanizer, and kept them there for one hour at a pressure of thirty pounds, temperature 260° F.

When they were removed almost all the albuminous material had been extracted. They would have served as excellent specimens wherein college students might easily and readily examine the position and size of the canals, but were hardly suitable for bacteriological experiments.

In closing I would express my thanks to Miss Byrnes, the Fellow of Biology at Bryn Mawr, who not only placed the requisite apparatus at my disposal, but also gave valuable advice and assistance.

GLASS FILLINGS, JACKET CROWNS, AMALGAM, GOLD CAPS, BRIDGES, ETC.—A SCRAP OF THEIR HISTORY.

BY WILLIAM H. TRUMAN, PHILADELPHIA.

"In cases where a cavity is in front of a cutting tooth, the amalgam stopping is objectionable from its metallic appearance; but, if a small piece of thin platina be cut so as to fit the mouth of this cavity, and on each side of this a few catching points be soldered, glass, the color of the teeth, may be fused on one side, and the cavity being partly stopped with amalgam, the catching points on the side uncovered by the glass, are pressed into the amalgam firmly, in the course of an hour or two the glazed platina becomes fixed by the hardening of the amalgam; this operation, if neatly performed, must give the greatest satisfaction to the patient. It is two years since the idea of trying the experiment suggested itself to me, since then I have often practiced it, and I can say always satisfactorily.

"When teeth are very much decayed, discoloured, or have their enamel much injured or disfigured, caps of gold, platina, or palladium, may be stamped up to fit them with the greatest exactness; the fronts of these dental caps must be glazed, and they can then be worn with much benefit."

The above paragraphs are taken *verbatim et literatim* from a "Popular Treatise on the Structure, Diseases, and Treatment of the Human Teeth," by J. L. Murphy, published at London, England, in 1837, pages 200 and 201 (No. 1594, "Dental Bibliography," by C. Geo. Crowley). Of the glass used for this purpose he says, "Glass of any colour, may be bought in the cane ready for use. All dentists ought to be provided with some of various colours, as it is useful in many instances." He gives minute directions regarding the construction of suitable furnaces for baking porcelain teeth, and various formula for preparing bodies and enamel. On this point he says, "A good composition for teeth may be made of silex, two parts; potash, two parts; dry potter's clay, one part; these must be well beat up together so as to be perfectly mixed. They had better be put in a mortar, and having been beat up sometime, water may be added to form them into a paste; this, after being well ground in the mortar, is fit for use." Teeth made from this body were first baked, then colored, then coated as thickly as possible on the fronts and as thinly as possible on the backs with a mixture of one part silex and one and a half parts potash, carefully beat up with water into a paste the consistency of cream. After this had dried they were again placed in the oven and subjected to a fierce heat for about two or three hours, when "the potash and silex will be found to have melted into a good glaze."

This description, to those who are old enough, will recall the painted teeth of our old friend Samuel Stockton and his compeers; teeth that had to be held to the grindstone in a certain way to prevent the enamel surface chipping off; if in an unguarded moment this was neglected, the glaze was apt to chip, at times the entire face of the tooth would scale off, occasionally burying itself into the finger end and calling forth sundry unsaintly ejaculations.

So far as I now recall, the author quoted is the earliest writer I have met with who speaks approvingly of amalgam, or gives directions for its preparation.¹ While few acknowledged its use, we

¹ American Journal of the Dental Sciences, vol. ii., p. 155, September, 1841.

have ample evidence that it was used by many; and that at an early date, early in the forties, if not before, tin, platinum, gold, etc., were added to the silver used in dental amalgam. Of amalgam, on page 104, he says, "I have for many years, used an amalgam of silver, prepared in the following manner, and though there are objections against it, still, until something better is laid before the public, it will be found of a highly useful nature. The ingredients necessary for the cement are silver filings, thinnest silver leaf (to be had in small books), and quicksilver. A drop of quicksilver is poured out from the bottle into a small mortar, or if more convenient, on a cloth; on this is placed a leaf of silver from the book, which, being worked into the quicksilver, becomes speedily amalgamated with it, another leaf is then added, and so on until the amalgam is a thick paste; if there be too little quicksilver in this amalgam, the want will be made perceptible by its non-adhesion, and, on being worked between the fingers, by its crumbling. If, on the contrary, it possesses too much mercury, it will be too soft, and the mercury may easily be squeezed out."

"When the amalgam is brought to a proper consistency, having just sufficient mercury to enable it to be used as a paste, a small quantity of silver filings should be mixed with it: these absorb a portion of the quicksilver, and hence there is insufficient mercury left to keep the silver in a soft state: thus, after the filings are introduced, the amalgam gradually hardens. Here, then, we are in possession of a cement which may be used in a soft cold state; yet, on being placed in the tooth, speedily hardens in the cavity."

In "The Parent's Dental Guide; a Treatise on the Diseases of the Teeth and Gums, from Infancy to Old Age," etc., by William Imrie, Surgeon-Dentist, London, 1834 (No. 1583, Crowley's "Dental Bibliography"), I find on page 105 the following in relation to gold caps:

"When the back teeth have become shortened, and do not touch their opponents in the opposite jaw, one or more of them on each side of either jaw, as may be found most suitable and convenient, should be covered with *gold caps*."

"Indentations should be formed on the grinding surface of the caps to correspond with those of the teeth; and for this purpose they require to be raised on a brass model of the grinders, a process well known to dentists of ability and skill."

"When only a few molar teeth remain in the mouth, although they may be extensively decayed, it is essential to preserve them, for purposes of mastication, and also to prevent the front ones fall-

ing a sacrifice to undue pressure. For this purpose the decayed molars should be plugged and afterwards restored to their original dimensions by means of gold caps. This is an effectual way, and may be recommended to persons who have an antipathy to artificial teeth." In illustration he recites a case where "the whole of the double teeth on each side of the lower jaw" were covered with gold caps to relieve the upper front teeth of undue pressure and wear caused by a wearing down of the grinding surfaces of the molars. This case, so far as the cause, the described condition, treatment, and result is concerned, reads precisely as do many such cases related in the dental journals of the last few years.

William Imrie, in a foot-note, quotes from Patterson Clark. I find the words quoted in "A New System of Treating the Human Teeth," by J. Patterson Clark, M.A., Dentist." My copy is of the second edition, London, 1830 (No. 1574, Crowley's "Dental Bibliography"). The first edition was published in 1829. Mr. Clark, from page 162 to the end of the volume, page 199, gives many cases which resemble very closely the cap- and bridge-work of the present day. This portion of his book deserves a careful study by those interested in the history of this department of prosthetic dentistry; indeed, as the book may be inaccessible to many, a reprint of these pages might be of much interest. We have no hesitation in saying, after perusing them, that if the dental engine with its revolving tools and grindstones, and the various cements now in general use, had been known and in as general use when J. Patterson Clark wrote, the bridge-work of his time would, in all probability, have been as satisfactory as is that of to-day. The want of these modern helps undoubtedly caused it to become, for the time being, a lost art.

Throughout the book there is much a thoughtful dentist will read with keen interest if not with profit. Defining his position in the profession, Mr. Clark says (page 164), "In a metropolis like this, where the division of labor, while it cannot injure the individual, is attended with advantage to the public, the art of the dentist admits of several subdivisions. Presuming on this, the author has long restricted himself to one department, viz., Preserving the Natural Teeth, and with a degree of success fully commensurate with his expectations. These operations consist in scaling, that is, in freeing the teeth from extraneous matter, and Brushing spongy gums into a healthy state; in examining from time to time, teeth that from their shape and situation, are liable to decay, and at the proper time Cutting out the commencement of

caries, and thereby Preventing its farther progress by the introduction of gold stoppings, by means of which a smooth even surface, incapable of retaining moisture long enough to rot in, is obtained, instead of the indentations where the caries commenced ; in Curing tooth-ache and tender teeth ; . . . relieving children from tooth-ache, to prevent the premature extraction of shedding teeth ; and after the teeth have been lost through accident, heedless extraction, or old age, in pointing out the most appropriate mode of supplying their place by artificial means, together with the person most likely to do it well."

Mr. Clark lays particular stress upon the importance of preserving in effective usefulness the back teeth, and pointedly calls attention to the resulting ill effects not only of their loss, but also of their lost effectiveness when from caries or wear they become so shortened as to permit the anterior teeth to occlude too forcibly. In all such cases he recommends that the shortened teeth be covered with gold caps fitting the teeth, "as gloves fit the hands," building them up by soldering upon the masticating surfaces layer after layer of gold plate, or where much addition is required he prefers to rivet a block of ivory to the gold cap, carving it to represent the missing portion of the tooth. He insists that these caps, whether of gold or ivory, shall not be left smooth and flat on the mastication surfaces, but that they be carved to represent the hills and hollows of a natural tooth, and so conform to the occluding teeth that when the mouth is shut they "lock into each other as they formerly did into the surfaces of the natural teeth." Intervening spaces between capped teeth he recommends to be filled with properly carved blocks of ivory riveted to gold plate fitted to the gums between the teeth and made continuous with the gold caps. He recommends that those portions of the caps visible from the front be cut away, and remarks of one successful case, "no trace of gold or artificial teeth could be observed on a casual glance at the ladies' mouth." He gives in detail a number of cases successfully treated by dentures that must have closely resembled the removable bridges of the present day, and claims for the method suggested that not only are the anterior teeth relieved from undue pressure so that teeth loosened from that cause have regained their former firmness, but, as the pressure of mastication is borne by the capped teeth, the gums being thus relieved, the dentures are worn with much more comfort and satisfaction.

The first case Mr. Clark cites he gives as the date when treatment was commenced "about the middle of the year 1828," and in

a later work published at London, 1836 ("Teeth and Dentism"), most of his remarks upon this subject are repeated.

It may be well to state that these methods are not given by Mr. Clark as originating with himself. From the language used I infer that they were methods of which he approved, well known to the dental art. While bridges supported in various ways by pins, dowels, or collars are known to be very old, and are illustrated in works I have of an earlier date ("L'Art du Dentiste," par L. Laforge, Paris, 1802; "Traité complet de l'Art du Dentiste," par F. Maury, Paris, 1828, and others), these are the only references to the early use of gold caps for protecting carious teeth and supporting dentures I have so far met with, probably a more careful and extended search might bring others to light. Jobson ("A Treatise on the Anatomy and Physiology of the Teeth," by David Wemyss Jobson, M.R.C.S.E., reprint, Baltimore, 1844) refers to their use in connection with plates and obturators, pages 112 and 118, paragraphs 121 and 122.

Reports of Society Meetings.

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE regular monthly meeting of the American Academy of Dental Science was held at Young's Hotel, Boston, Wednesday evening, December 5, at six o'clock, President Smith in the chair.

The paper for the evening was read by Dr. H. F. Libby, of Boston. Subject, "A Method of inserting Gold Fillings with the Use of Hand-Burnishers."

(For Dr. Libby's paper, see page 325.)

DISCUSSION.

President Smith.—Gentlemen, it is not only a great pleasure, but a great profit to meet a man of strong individuality,—a man who not only thinks, but puts his thoughts into practical shape. That is what Dr. Libby has done in presenting to us this evening a very practical paper on a very practical subject. I, for one, feel deeply grateful for the manner of its presentation, and I feel that I echo the sentiments of all in making this statement.

Perhaps it would be fitting that Dr. Fillebrown, who has been freely quoted by the essayist, should open the discussion on this subject. Although no arrangements have been made with Dr. Fillebrown to do so, I trust he will make the opening remarks.

Dr. Fillebrown.—I have been very much interested in the paper. It is divisible into two parts. One may be called the development of the plugger, and the second its application.

The Harvard pluggers have been considerably quoted to-night, and as I had something to do with their evolution, it is proper for me to speak of the manner in which they were evolved. At the time that Dr. Shumway first introduced the ivory points, I was as much interested in the matter as Dr. Libby. I am glad to have my memory refreshed in regard to the time that has elapsed since then,—I was not aware how long ago it was. The first knowledge that I had of Dr. Shumway's using ivory points was from Mr. Hood, who was then travelling. He came into my office one day, and in the course of conversation made the remark that Dr. Shumway was filling teeth with ivory points by rubbing the gold in, and that a smooth steel point would answer the same purpose.

I was at the time operating for a lady patient, and left her to speak with Mr. Hood. There was a cavity which I had just finished excavating on the distal surface of the left inferior bicuspid, which was extremely hard to get at. I was at that time using the mallet exclusively, it being then in vogue. I had decided before seeing Mr. Hood that that cavity was a place where I could not use the mallet, and had almost come to the conclusion that I must fill it with something besides gold. I said to Mr. Hood, "I have a cavity in which I can try the method of which you speak," and I immediately took an old excavator and broke off the end to about the right size, smoothed it down with a file, sand-papered it, and finished by polishing with pumice-stone, so that I had a tolerably smooth surface. I did not stop to temper it, but went right to work to fill the cavity at hand. I do not believe it was thirty minutes after Mr. Hood first spoke of this method to me before I had that cavity filled. Fifteen years afterwards I examined that filling, and found it to be as perfect as when first put in. Instead of using Dr. Shumway's method of rubbing the gold, I applied the force as Dr. Libby mentioned,—namely, carrying the gold to place and turning the instrument a little, and at the same time giving it a gradual pressure.

I did not burnish in each piece, for the reason that if you rub gold too much with a steel instrument you will injure its surface.

After placing in the above-mentioned filling I at once made a set—a half-dozen to begin with—of those smooth points; laid aside my mallet, and for years afterwards used that method. Dr. Shumway sent me a set of twenty-four of his ivory points, and I did some good work with them, but was never fully satisfied: they were too frail and weak. Finally I made patterns for a set of pluggers, which I sent to Philadelphia and had made in steel, tempered just as hard as they could be, and I put in fillings with those, even in the incisors, and they gave me great satisfaction. I remember one case where there was a crescent decay in the cutting-edge of a lateral incisor. I contoured this with gold, and for years it was doing well, and the result was that I led several of my friends to adopt this method. I had five or six sets made of these smooth points in Philadelphia, and they were distributed around among my friends, but they did not have such good luck with them as I, and later had them serrated. Unless one was very careful in using these smooth points, especially in contouring a surface where there was nothing to hold the gold, the pluggers were very likely to slip, and it was here that my friends found their greatest difficulty.

After a time the effort to prevent the slipping began to tire me, and I followed in the footsteps of others and had some very fine serrations put on the oval surfaces, and have used them ever since with great success. That is the evolution of the Harvard plugger.

One point that I wish to call attention to is the fact that the Harvard plugger was never intended for use with a mallet, and no filling which has been exhibited here shows the work of the plugger in any proper way. In using those oval points with a mallet you will not, of course, get the gold evenly packed, so I cannot admit it to be a fair test of the work of the plugger to show a filling which has been put in with a mallet. The proper way to use those points is with hand-pressure, and when you bring down the pressure roll the plugger a little, and that force will condense the whole surface of the piece of gold you have just put in. I don't know how a filling made in that way would look under the microscope, but you cannot expect the best work from the Harvard plugger when used with a mallet.

I want to say that I am pleased with this set of pluggers that has just been passed around. They answer a want that I have repeatedly felt, and I thank Dr. Libby for the form of handle which he has given us, as it is just what I need.

The statement which Dr. Libby quoted from me, that you must

not rub gold at all, was made in early days. I know perfectly well that it can be done, and the Herbst method is an excellent way to fill teeth. It is particularly useful in starting fillings. When you wish to be positively certain that the gold is in close contact with the surface of the cavity, take some soft gold and, as I put it, just let it "smell the flame;" lay in sufficient gold to loosely fill the cavity, and upon this a piece of cotton, and rub the cotton into the cavity with a burnisher; you will be surprised to see what a wonderful adaptation there is of gold to the surface; then add more in the same way until you have a good foundation upon which you can pack your gold by pressure. This soft gold should not be absolutely non-cohesive, but such a kind as can be readily made a little cohesive,—enough to give it a kid-like feeling and softness. It is a non-cohesive gold, and yet has cohesiveness enough to make it maintain its connection with the rest of the filling; in this you have one ideal filling. Dr. Libby's is another ideal filling which, from the illustrations he has shown, seems to possess great merit, and I certainly thank him for bringing before us to-night his method in a manner which has been so plain; and I certainly want to know more about it by observation of the operation itself.

Dr. Andrews.—I want to say how much I have enjoyed Dr. Libby's paper. I know how earnestly he has been at work, for I see the evidence of it, and it seems to me that other members ought to take up some special subject and work it up in this way if necessary. I believe in the power of pictures to show what one means. I have worked at that thing myself and have done a great deal of micro-photography. I would like to ask Mr. Smith what power was used in making these photographs.

Mr. Smith.—The objects were magnified in the original photographs seventy-five to one hundred times, and as they were cast on the screen at a distance of forty feet, the pictures represented an enlargement of about five hundred times.

Dr. Andrews.—Thank you, I have enjoyed the views very much. I have used the old ivory points, and I believe I have done some good work with them, though I have not used them much of late years. I confess that I could not always make the pieces of gold stick.—I mean in working this way. I tried this method at Dr. Libby's office and it worked well, and I have ordered a part set of these instruments. If Dr. Clapp were here he would commend them. I am sure, as he has had some little experience with them. I think that if it were only for presenting this style of wooden handles, Dr. Libby has done a good thing for the profession. He has given

us a set of instruments with which we can do our work easier and better than with the old steel handles.

Dr. Williams.—Dr. Libby has excellently demonstrated one principle, which is a very old one and one which was often referred to by Dr. Joshua Tucker, and that was the difference between the gradual, steady pressure and a jerk. He illustrated it in this way: we will suppose a man to be a good operator, but he is nervous; he puts his gold in and presses it into place by a sharp jerk. Another man takes a little and puts on gradual pressure, and the filling made in the latter way will undoubtedly be more durable. Dr. Joshua Tucker was one who established a reputation for a solid gold filling, and it was partly by that method, on that principle, that he attained his excellence. He also made use of the principle that was alluded to by Dr. Fillebrown, that of slightly annealing the gold. I learned from one of his pupils that it was considered a secret by him in those times.

I am very glad that Dr. Libby has so admirably illustrated this principle, which, in the hands of Dr. Tucker, helped to give the first success and reputation to gold fillings.

Dr. Wiksell.—I have two reasons for wishing to speak: one to thank the Academy for the chance of hearing this paper, and again, to speak a little in endorsement of the method. I think we all by this time have recognized that there is a Libby method; that no matter what its evolution has been, we have had some distinct and original ideas presented to us. I have had considerable success with this method where I have had faith to use it. Not having Dr. Libby's instruments, I have used the common burnishers and the corkscrew pluggers with universal success. So far I have been waiting to see a filling come back broken off. A bicuspid which I have filled has been standing the force of mastication for some two months. I felt when it went out of the office that the patient might be back within a week, but I saw the filling to-day, and it was as solid as ever.

One point that the doctor did not call attention to is this, that he uses a bur slightly larger than the size of the plugger which he proposes to use in putting in the filling.

Dr. Gerrish.—As one of the guests of your society, I want to thank you for the privilege of being here. For thirty years I have followed one line of practice, and in that particular method I have had very satisfactory results. I am a user of Abbey's non-cohesive No. 4 foil. I adopted it at first, and have used it constantly from that time to the present. My method has not been what Dr. Libby

describes as a burnishing method, though I have inserted all my fillings with hand-pressure, and the force has always been exerted with the sides or angles of the instruments. I have continued in that line of work for the reason that I have been, modestly speaking, satisfied with the results.

I became acquainted with Dr. Libby at his home in Wolfboro', New Hampshire, and we have spent many pleasant hours together in fishing, hunting, and talks on dentistry. He described his method, and told me that if I would come down to his office he would show me the whole system. I was very much interested, the more so because a short time before I had repaired a filling for the wife of an Episcopal clergyman, a patient of his, which excited my curiosity, as it contained no pits. This fact led me to consult him, and he kindly showed me his method of operating, which I adopted at once.

I don't believe there is any other form of gold or method of work that will save a tooth as perfectly as non-cohesive foil. I am old-fashioned in that. I respect the work of the leading operators of other methods and have had a chance to see their fillings. I think I have worked after as many eminent operators as perhaps any man in this room, and I have studied the fillings, trying to find out, if possible, the method that the dentist used. My definition of a perfect filling is one which makes the best adaptation to the cavity or the most perfect adjustment to the walls of the tooth. It should also be hard enough to withstand the force of mastication, and it should be easily put in. My method, I claim, has the first two advantages. So far as the latter is concerned, it is not easy to do it,—it requires a good deal of work, and it differs from Dr. Libby's method in that I use the sides of the instruments, while he uses the point of the instrument to fasten the gold in place, and then the instrument is turned and becomes a burnisher, so that each new piece extends a little bit beyond the original piece. Now, the adaptation of that extension is perfect, because the piece is very small. I admit that many of the operators who use the mallet get beautiful, solid fillings, but the trouble is with some they don't fit the cavity. I have seen fillings that you could take out and find to be a perfectly solid mass of gold, but they were not worth a picayune for saving teeth. When a piece of gold is once moved from the place that you put it, it isn't worth anything for the saving of the teeth. In Dr. Libby's method the extension of the gold is so minute and it is so carefully pressed into place that there is a perfect adaptation to the walls of the cavity, and the success of the filling is assured.

For the last thirty years I have used the non-cohesive foil, using for the past two years Dr. Libby's method for finishing and contouring.

Dr. Dodge.—For quite a number of years my time has been almost exclusively occupied at the operating-chair; although I have achieved a fair amount of success, I have been uncomfortably aware of the deficiencies of my operations. Until recently my method of inserting gold fillings has been largely with the automatic plugger and cohesive gold, and many times have I noticed a lack of adaptation to the walls of the cavity; and many times a disintegration of tooth-substance at the margin of the cavity. In the course of my inquiries I found Dr. Libby was apparently getting the results I desire to attain, and I determined to learn more of his method. I received an invitation from him to attend a clinic at his office last June. To say that I was pleased with the operation that was there performed only expresses it mildly. My eyes were opened to possibilities in the working of gold of which I had not dreamed; I felt that what Dr. Libby had done I could probably do, and I ordered from him at that time a complete set of his instruments. On my return to my office I felt it was almost impossible for me to go back to the old system of filling; I therefore went to work and made burnishers from such instruments as I could readily procure, and when I say that from that time until the present I have inserted only burnished gold fillings (where gold has been used), you can form some idea of my feelings in regard to this form of filling. And, furthermore, I wish to say that I have no hesitancy in my friends examining these fillings with a powerful magnifying-glass. Speaking of the magnifying-glass, I am strongly wedded to it in examination of the teeth for cavities and in the excavation and preparation of the same. Cavities which formerly I considered thoroughly excavated when examined with a mouth-mirror of small magnifying power, such as are furnished by the dental depots, when subjected to the use of this magnifying-glass very often show imperfections which can be remedied.

I wish to say that I believe I have found in the method of Dr. Libby a system of filling that by the exercise of due care and a strong determination to overcome all obstacles will save the teeth of our patients better than any method that I have ever before seen used.

I have not found much difficulty in picking it up with these instruments highly burnished. When I received the set of instruments which I requested Dr. Libby to have made for me, the first

thing I did was to examine them thoroughly with this powerful magnifying-glass. I noticed in them as they came from the manufacturers a good many scratches and indications of unevenness. I polished them off with a chamois-skin buff, using crocus; then I made a buff of cotton flannel, and, using rouge for a finish, I got as high a polish as I could possibly get upon them. That is the condition they are in when I am using them, and I believe that I can do a great deal better work by having them highly polished than as they were when sent by the manufacturers. There is not so much possibility of little particles of steel working into the gold. I never use them a second time without giving them buffing at least with the cotton flannel, and sometimes with the chamois.

Dr. Wiksell.—I have been trying to convince Dr. Libby of the use of an assistant. A sharp-eyed girl, I calculate, saves just one-third of the time for an operator. My assistant picks up the gold with a platinum point, anneals it, and puts it right where I want it. I timed Dr. Libby one day while he was operating, and in one column I put down the number of seconds that it took him to pick up his gold, anneal it, and put it where he wanted it, and in another column I put down the number of seconds that he actually occupied in burnishing, and on adding up the two columns of figures it was found that he had spent thirty-three and one-third per cent. of his time in picking up and annealing the gold. Therefore I estimate that he could do with an assistant two hours' more work a day. I had this drummed into me by a neighbor, a brother dentist, and I am going to drum it into other men,—that to work with an assistant is the greatest saving. You don't have to take your mind off the operation after the girl is trained in what you want her to do, and she earns her pay twice over every day.

Dr. Werner.—I have the pleasure of being an invited guest this evening, and it is a privilege that I much appreciate. I am very much in favor of what Dr. Gerrish has said. Still, he comes short of my ideas.

Dr. Gerrish.—I do of my own, doctor.

Dr. Werner.—For I want to continue to full contour. I think he has the right ideas in the use of non-cohesive gold, but I wish to use the matrix in order to thoroughly condense it and finish with cohesive gold, bringing the filling out to full contour; then I think we have the ideal conditions. I would ask Dr. Libby if he has ever used tin-foil in his method?

Dr. Libby.—No, sir.

Dr. Werner.—I find tin-foil an excellent article for use at the

cervical wall, and I believe that our best results come from using tin-foil and gold at that part, say in proportion of one-half of tin to one of gold. I am a thorough believer in gold; I believe when we work it right with tin at the cervical wall it will do more to save teeth than any other filling-material, and I use it in every possible case. Of course in many cases the cements are the best preparatory filling-material. As to amalgam I have a very poor opinion of it and a very limited use for it. It is a pity we never had illustrations of how gold can be condensed at the cervical wall when surrounded by a proper and firmly held matrix. At that point our fine operators have failed. They did good work and made excellent solid cohesive gold fillings; their failures were at the cervical wall, and how could it be otherwise? When you put retaining-points and pits at the cervical wall where the enamel and dentine concentrate in thin layers, and then hammer cohesive gold against that, how could you expect the tooth would stand it? How different when a matrix is placed there, and your non-cohesive gold is thoroughly condensed: then we get a perfect adaptation and strengthen the weak surfaces.

The greater part of a cavity, say four-fifths, I fill with non-cohesive gold, finishing with cohesive rolled gold of No. 40 or 60. General principles we should hold fast to. It does not matter how you condense, with serrated or non-serrated or with wooden points. I believe the essayist has the vital principle in his method and I will be glad to see him operate very soon.

Dr. Fillebrown.—There seems to be a misunderstanding in regard to the surface of the gold that was shown in these pictures. I understood that the filling was put into this cavity and then removed, and the picture shows the surface that was adjusted to the bottom of the cavity.

Dr. Libby.—Did not I mention that the ivory slab was divided into halves? That was a serious omission, as it is quite important to know that in order to understand what surface was exposed to the microscopic lenses. It was divided in halves and bolted, and after each filling was put in and finished the bolts were removed, and when we parted it the filling dropped out.

In relation to using tin at the cervical wall, I saw one case that came from an advocate of this method in New York, and it disappointed me so much that I never undertook to use it in my practice. I cannot see why it is not just as well to pack soft gold at the cervical wall, if you have instruments with which it can be done properly, and in my estimation it is much better, for you cer-

tainly avoid the discoloration, and not only that, but there are some conditions of the mouth that will dissolve tin, and you are not taking any chances of that kind when you use gold.

Dr. Andrews.—Some have expressed a desire to know what kind of gold Dr. Libby uses.

Dr. Libby.—I used for fifteen years, exclusively, Hood & Reynolds No. 3 foil, which is an extra soft cohesive gold, and it always gave me great satisfaction. I knew there was going to be a time when I should show this method before the societies, and I went to work two years ago experimenting with the various foils, and I found no difficulty in using any kind of foil as far as the working of the gold was concerned. To day I am using Williams's electric foil. It comes beautifully folded for my use. I am now using No. 40,—I began with No. 30, but I did not find substance enough in that and so changed to No. 40, which seems to suit me very well. I have tried rolled gold, and that can be worked just as well. I do not see any benefit from using the rolled gold, but there is no difficulty in working any of them by this method, and I would say that No. 3 foil, the electric, and the rolled, all produce a fine finish.

Dr. Andrews.—You say in regard to these bars of gold they were filled into a form of ivory which was then taken apart and the filling taken out.

Dr. Libby.—Yes, the same surface was shown in every picture; they were all taken from the sides of the different fillings.

Dr. Andrews.—How would it do to fill in, by these different methods, against a surface like glass,—an absolutely perfect surface?

Dr. Libby.—That is not practical in our every-day work. However, as the same surface is shown in every case, it is just as fair for one method as for the other. In the mallet-bar you saw a great many patches, plainly exhibiting what phenomenon occurs in trying to mallet a piece of gold. I have been asked a great many times how will these fillings wear? Several people have said, "I don't think they will stand attrition or the amount of work that will come upon them." Well, I have had no difficulty whatever in that respect, and it is a curious fact that away back at the time of my failures, not only with soft foil but with cohesive foil, the failures were up where I could not reach them,—at the coronal surface they seldom failed, and apparently it was because I did not have the proper instruments to reach the bottom of the cavities that I failed in my early work.

Dr. Wilson.—I noticed that some of the larger instruments that

Dr. Libby has passed around are very slightly serrated,—are they not?

Dr. Libby.—Yes, they are serrated for one purpose only,—that of picking up the gold. Let me tell you that the large instruments I do not use for burnishing; they are simply made for packing soft gold.

Dr. Cook.—I would ask Dr. Libby if the cavity into which these bars of gold were filled was smaller at the top than it was at the bottom?

Dr. Libby.—Yes, it was something of a pear shape.

Dr. Cook.—In such a case I should not expect that you would get as good a result from the mallet as you would from burnishing in with your points which were fitted and shaped for that kind of a cavity, and I do not consider that it is hardly a square test for the mallet. I should not think of packing cohesive gold into that kind of a cavity, I should prefer to have it larger at the top than at the bottom.

Dr. Libby.—That is a form of cavity that I should not consider universally practical,—square walls. I believe in spherical surfaces, and if I used straight walls, it would be a departure from the way in which I usually prepare my cavities. My usual practice is to have the base of the cavity as rounding as possible.

Dr. Cook.—The point I wish to make is that, while a cavity prepared in that manner may be best for filling by your method, it is not adapted for the reception of a filling which is packed in by a mallet. Suppose we illustrate by an ordinary cork stopper,—that is larger at the top than it is at the bottom, and the farther in you drive that cork the more effectually it stops up the mouth of that bottle. Now, if we had a cavity prepared in that manner, as we packed our gold in the pressure applied would carry the gold towards the walls of the cavity, but in trying to mallet a filling into a cavity that was larger at the bottom than at the top, you drive the gold away from the walls of the cavity, and the illustrations on the screen are not a fair comparison, because the cavities are not adapted to the same methods.

President Smith.—In regard to Dr. Libby's instruments, which were shown on the screen and also were passed about here, I would say that you can use them as we commonly use the hand-plugger direct, or you may follow the burnishing method described by Dr. Libby. I have used them as hand-pluggers with great satisfaction for some time. The instruments, in themselves, I think are simply grand.

Are there any more remarks? Perhaps Dr. Libby may have something to say in conclusion before we close the discussion of the paper.

Dr. Libby.—Just a few words only. I wish to thank the gentlemen for the kind attention which they gave to this paper and for the interest which has been displayed in my method. I do not claim that it has reached perfection, and would suggest that each one who takes interest enough in it to put it in practice should try and discover some new feature that would be of interest to all of us. Dr. Dodge has already started the ball a-moving, and presents an idea that I have not looked into particularly,—that of a more highly polished surface than burnishers are usually finished with as they come from the manufacturers,—and so other gentlemen will discover points, and our combined observations may produce a method of filling which will give entire satisfaction to ourselves and to our patients.

Dr. Allen.—May I ask if these instruments are in the market?

Dr. Libby.—They are made by the Boston Dental Manufacturing Company, who now have orders for quite a number of sets. I have had great difficulty in getting what I wanted, and there has been some delay in getting them out, but I did not want any of them to go out until they were just right.

Dr. Eames.—Thanks seem to be in order, and I wish to express my appreciation of Dr. Libby's paper, and especially the illustrations. We have had many papers in the past whose value would have been enhanced, perhaps, more than one half by proper illustration. I would move you that the thanks of the Society be extended to Dr. Libby for his valuable paper and illustrations of the method of filling he has presented to us this evening.

Unanimously voted.

WILLIAM H. POTTER, D.M.D.,
Editor American Academy Dental Science.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

THE regular monthly meeting of this Society was held January 12, 1895, President Dr. C. N. Peirce in the chair.

At the conclusion of routine business, Dr. Joseph Head read a paper entitled "Plastics as a Bar to Bacteria."

(For Dr. Head's paper, see page 349.)

DISCUSSION.

Dr. Brubaker.—I hardly think I have anything to say on this subject. The first fact to be considered is, Does the fluid in the tooth that is filled pass through the filling to the interior of the tooth? And, secondly, assuming the fluid does pass through the tooth, is it likely that bacteria will follow the fluid? Might it not be possible that fluids can go through without conducting bacteria. Of course, these bacteria can be readily seen by a sufficiently high-power microscope. I would like to know what power lens the essayist employed to detect these bacteria.

The Pasteur filter is composed of clay that has been burned. We find water will pass through it under very considerable pressure, but after three months continuous use bacteria will be found in enormous numbers on the outside of that clay; but it has been almost impossible ever to find bacteria on the inside of it. And this is true not only of water, but of beef broth and a great many other fluids.

Therefore, the only fact in this paper which I see is, first, the demonstration that fluids pass through the teeth; secondly, the demonstration of bacteria going through with the fluids. The writer states that they have gone through. He does not state what kind of bacteria.

Dr. Head.—Single micrococci, two joined in dumb-bell fashion, and large numbers of colonies. Miss Byrnes, the Fellow of Biology of Bryn Mawr, also examined them, and it was she who really had to decide whether bacteria were present, and on the examination of each cone she saw them. We had an immersion lens, magnifying eight hundred diameters.

If there is any microscopist in the company who doubts the presence of bacteria, there are still some unopened cones in the bouillon which I shall be very glad to put at his disposal.

Dr. Smith was called upon, but did not respond.

Dr. Faught.—I have nothing to say in addition to the scientific character of the paper, but desire to express my appreciation. Such a subject requires going over very carefully in its details before one can speak with any accuracy upon it, and it is valueless unless it is accurate. In looking it over I do not, at the first glance, see anything that could be questioned, unless it was the question of sterilization, and I would not like to raise that, because the method employed seems to be thorough. We have not only the testimony of Dr. Head, but also the additional testimony of

learned authority, which points to its having been carefully and accurately done. This is a paper that would bear discussion at a future date more than at the present time, after some one had had an opportunity of verifying the cones enclosed.

Dr. James Truman.—This paper seems to me a mere question of fact, and one that we cannot well discuss. I cannot understand how micro-organisms can enter into cement fillings, or fillings of tin, gold, or amalgam, and yet those fillings preserve the teeth. That is the only point that seems to me objectionable in these experiments. I think it requires further work. If micro-organisms, if pathogenic germs, enter through fillings, how is it possible that fillings of that character preserve the walls. I have no doubt at all that these enter some fillings; but I cannot comprehend how this is possible with cohesive gold thoroughly packed. If that filling is flush with the walls, it must be preservative. The question is whether it is possible to absolutely make a malleted cohesive gold filling flush with the wall so it will prevent ingress of micro-organisms. I do not regard it as impossible, but it is very difficult.

But if micro-organisms penetrate into the plastics, as they seem to have done in the experiments of Dr. Head, the question arises, How is it that fillings preserve the teeth? But this is a question foreign to the paper. He has simply demonstrated a single but a very important point, that micro-organisms can enter into a plastic filling. Now, we know that in the oral cavity there are many kinds of germs, pathogenic and non-pathogenic. Whether a certain kind of micro-organisms can enter into fillings of this character while they prevent the ingress of others that are destructive to the tooth-structure needs further investigation.

Dr. Head.—There is one point apropos of what Dr. Truman has just said. The bouillon was sterilized first, and then inoculated with the decayed tooth substance. So it would seem that a large part of the germs found were the germs of tooth decay.

Dr. Peirce.—As Dr. Head has two or three cones yet unopened, I would like to suggest that one be given to Dr. Truman and one to Dr. Brubaker, and so enable them to report on their contents at some future meeting.

Dr. Broomell then read a paper in defence of an article which was criticised by Dr. William H. Trueman in the INTERNATIONAL DENTAL JOURNAL.

Adjourned.

JOSEPH HEAD, M.D., D.D.S.,
Editor Odontological Society of Pennsylvania.

ACADEMY OF STOMATOLOGY.

THE regular monthly meeting of the Academy was held at the rooms April 23, 1895, the President, Dr. Jack, in the chair.

The paper of the evening, entitled "The Scientific Spirit and the Ethics of Dental Practice," was then read by Dr. Chas. J. Essig.

(For Dr. Essig's paper, see page 343.)

DISCUSSION.

Dr. Roberts.—I think I can see one way by which there may be a very great difference of opinion in the number of cavities to be found in a mouth. I went into an office some time ago and the dentist had a patient of mine in the chair. He said, "I have examined the patient's mouth and put in four gold fillings, and there are about two more and her mouth will be in perfect order." I looked at the instrument he was using and found it was quite a large excavator. I took a probe and found twelve cavities which I demonstrated to him and her; well marked cavities in the crowns of the teeth and the proximal surfaces.

The essayist made a statement that gold is recognized as the best material for filling teeth,—is that so?

Dr. Essig.—I said it is so regarded; that is not my opinion.

Dr. Roberts.—I intended taking exception to it as being the best under certain conditions.

Dr. Grosser.—I think in Dr. Roberts's case there was no difference of opinion; it was a matter of lack of ability to diagnose. I suppose all are acquainted with the kind of enamel in the so-called fissures, in which there has been imperfect development, and where without experience it would certainly be decided decay was not present; so that in the case mentioned it was a mere lack of ability.

Dr. Currie.—I think often we are puzzled to know just what the code of ethics would require of a man when a patient presents himself for examination, and we cannot help but discover cavities in the mouth. I recently had a patient where I not only found simple cavities, but some in which the pulp was very nearly exposed. She assured me that in the last few days, not over five, she had been to her dentist, and he had been unable to find any cavities. Now, just what is expected of a man in that position I do not know. Surely our profession requires of us that we tell the truth, and our patient demands our best judgment.

I must confess that while there are some differences of opinion which might be ascribed to judgment, yet there are undoubtedly some which require criticism. Does the essayist think those cases should be treated that way, or should we pass them by and permit our charity to cover a multitude of unsightly things?

Dr. Essig.—It seems to be a case so very clear that a few words will answer it. It is surely the duty of any dentist in whose hands a patient comes to find cavities, if they are there; but when criticising the other dentist is attempted, it shows a low standard of ethics, and a man who is a gentleman would not do it.

Dr. Roberts.—Is not the fact of finding cavities a criticism of the other dentist? What are you to do, refer the patient to the former dentist?

Dr. McQuillen said that all were likely to make mistakes, and a dentist would sometimes find that, upon a patient returning, he had missed something, and he was honest enough to say it had been so in his case. The doctor spoke of a maxim of his father of which he often thought, and that was, if he had not a good thing to say about a man, he did not say anything at all. He thought that was as good a code of ethics as a man could work under in his profession.

Dr. Roberts.—Will *Dr. Essig* give an opinion on the following case. A patient of mine brought her sister to me, who had just been under the hands of another dentist, to have her mouth examined. Two incisors had been filled, the upper one with gold, and in one of them there was a large space between the gold and the enamel of the tooth. I could pass the excavator directly into it. Her sister was watching at the time, and said, "What is that?" I said, "I think the doctor has slipped a little here, and I would advise her to return and ask him if it was all right." Is that the right thing to do?

Dr. Essig.—I think the sending a patient back to a previous dentist is right; that is exactly what I would do myself. After that, if the patient comes to you, you are free. But to openly criticise to the patient the work of another dentist is a thing that I cannot characterize in strong enough terms.

Dr. Christensen.—The essayist said that no amount of education would make a gentleman out of a man who was not one by nature; it seems to me that is really so. Persons are taken into the colleges in this country with but a limited amount of previous training; this is the great difference between this and the old country. I do not mean to hold the old country up as an example

of something better; we do on the other side too much of the general training or education, and regard special education too little; but it seems to me the general education should not be neglected. I think there ought to be a standard established before a college is entered.

Dr. Essig was of the opinion that a man, as he stated in his paper, would never be a gentleman unless he was one by nature or by training, or rather, that no written code would create that which had no existence.

Dr. Deane.—I was thinking of some points in active practice, where no code of ethics would exactly cover the conditions. There are many such, especially in the treatment of children's teeth, in which it would not do to operate at that sitting, where it would be better to do so at a later period; also when the patient passes into the hands of one who is unscrupulous, who will force an excavator into the fillings and say, "There is a cavity." That person ought, in my opinion, to be ruled out of any society or association.

I am, perhaps, bitter on this point, for the reason that lately I have had a law suit. I had filled the front teeth with phosphate, two approximal cavities in the incisors, because I felt the tooth substance was too weak to stand anything in the way of gold. The young lady claimed on the witness stand that she went to Baltimore and a dentist there filled them with gold and they had gold fillings in at the time. Fortunately for me, she claimed that all of my work had to be taken out and refilled with gold, the back teeth as well as the front. The two experts I had with me examined the mouth and found that all the amalgam fillings were still in the posterior teeth and she had no decay in them. I am still of the opinion that the phosphate would have served equally as well as gold and perhaps better for a few years. It is such men that the code of ethics should reach in some way.

Dr. Roberts.—I did not finish the description of the case I referred to. I said to the patient, "Will you take a note back to your doctor," who happened to be a friend of mine, as well as her dentist. She replied she would, but changed her mind subsequently. She stated she would write him a note, if I did not object, and tell him that she had left his office, and would seek services elsewhere. I would like to know just what is required of a man in a condition of that kind.

Dr. Burchard.—Some nineteen hundred years ago, I think there was a code of morals given to the world that will cover all points

brought out this evening, or can possibly be brought up at any time; and it is comprised in what is ordinarily known as the Golden Rule. Rudyard Kipling, in one of his works, speaks of a certain ape, and says it has too much ego in its make-up, and that is a disease that afflicts not only apes but a majority of mankind; and a lesson man needs to learn is that ego and alter-ego are not enemies, but brothers; that what the world needs is the development of more of the altruistic spirit, and less of the egoistic spirit; by that I think all differences of this sort will be solved.

Dr. W. H. Trueman.—I am very much impressed with the paper; it is a very good one on a subject not very often considered, but which I think might be discussed very profitably. It indicates a deplorable factor in the profession, and I should think it was overdrawn; at least, I should hope so. I have met with a few instances of that kind; patients have left me and have left the other man.

How shall we get at this matter and remedy it? That is the main point. Professor McQuillen struck the nail on the head many years ago when he said a gentleman does not need a code of ethics, and a man who is not a gentleman will not heed it. If we would find the remedy in the matter, it seems to me we ought to go to our dental societies, beginning at the one standing on top, for I think we find the code of ethics is there rather more rudely broken than in any cases Professor Essig has related to us.

I have had some little experience of that kind,—I am not growling. I was at the meeting in Cincinnati some years ago, and an excursion was arranged for the afternoon to the Zoological Garden, and those participating were to be supplied with badges. I went to the one in charge and asked for one, and he said they were for members only. I had paid my dues and had the ticket in my pocket and showed it to him. He said, "How do I know you are the man on that ticket; how do I know but that you picked the ticket from the floor; you must be identified by some one." A prominent member passed by, and I said, "He knows me." He looked at me and said, "Doctor, you had better be identified by a member of your local society." I felt hurt. I am inclined to think that it was not the right kind of treatment. I had been chairman previously of a section and had read a paper. I think this was a greater violation of the code of ethics than any Dr. Essig has mentioned.

On another occasion I was requested to prepare a paper, which I did at considerable expense and time, and sent it in and received a very complimentary letter. I did not attend the meeting, but

the paper was read, and some one called out, "A barefaced advertisement," or words to that effect. Yet I was not there as a salesman and had nothing to sell. I had no interest except that if I find a good thing I desire my professional brethren to share it with me. The next communication I had with the society was my resignation.

I think these things ought not to be, and the code of ethics should be lived up to in a kindly spirit in our dental societies.

There is another point that I think is a violation of the code of ethics. We all know we have honest differences of opinion; you very often find a practical paper on some practical subject, in which some new process is broached, and the writer generally begins by finding fault with every one else and every other method except the one he has adopted. Sometimes very important improvements are made. I remember one instance at Asbury Park, where a paper was read.

Remarks were made which were very uncalled for and were a gross violation of the code of ethics. All professional men who are original thinkers will at times feel differently and think differently, and we should respect each other's opinions if a new thing is broached; we cannot always adopt it at once, needing time to consider it. It appears to me that when we get to that point in our dental societies where we can discuss differences of opinion kindly, we shall have gone a long way in correcting these matters to which Professor Essig has referred.

Dr. James Trueman.—I do not feel I have very much to say on this paper. It is a timely one, for I think there is altogether too much violation of the code not only of that described by Dr. William Trueman in societies, but in individuals. I can have but little sympathy with it. Gentlemen will never do that kind of thing; but I doubt whether education will help very much; it cannot eliminate inherited proclivities.

I happened to be present when the paper to which Dr. Trueman has alluded to was read. It was the American Dental Association. He didn't give the name, but I give it. I was shocked that any one should be so treated in the leading association of the country. I suppose that somebody was tired; worn out by a long session, and coarsely made that remark. It was unpleasant and uncalled for.

But it seems to me there is a deeper thought in this matter, and that is that men differ and may differ honestly in regard to practice. They may say, for instance, there is not a cavity in this

mouth that needs filling, and then the patient may visit another man, and he may pick out twenty or thirty in the same month. Why? Simply because this last operator lacks experience. Let me illustrate this. Take a person with very dense teeth, over forty years of age. Now suppose that patient falls into the hands of another who has probably just graduated. I do not care from what school; it is immaterial. With his glass he will observe the black lines running over the teeth where the fissures formerly were, and he will say, "Why, you have fifteen or twenty fillings needed on the masticating surfaces of the teeth." Let this patient fall in the hands of an experienced operator and he will say to that individual, "You have no cavities that need filling." His judgment would be that there had been an arrest of decay there and that there would never be a necessity for filling the cavities, and to cut out these dark lines would not only be a waste of time and strength of a man, but a wrong done. The differences of opinion here may be honest; inexperience against experience.

Again, there is a difference with many of those who are advanced in the profession. For instance, very recently in a discussion of Dr. Perry's paper, I made some remarks endorsing the views held. I received a private letter taking me severely to task for the opinion expressed, the writer stating that he was surprised that I would advocate the idea that filling of children's teeth with gold was wrong practice; that he had filled teeth for many years, and had been trained under me, etc., and felt almost hurt that I should now advocate filling teeth with gutta-percha. Here was an honest difference of opinion, and there must be some reason for it. I cannot conceive how two men, equally instructed, should arrive at such opposite conclusions. I am inclined to attribute it to climatic conditions: that my friend and critic can do in the Sandwich Islands that which is not possible for us to do here, with our ever-changing temperature. So, therefore, the more we look at the matter outside of personal antagonisms, I feel that there is still a wide margin for an honest difference of opinion, and while it is not necessary to say anything derogatory of our brethren, we must still give an honest judgment on cases presenting.

Dr. Essig.—If it is in order for me to rise again, I would like to speak on some points Dr. Truman brought out. Patients do quote us sometimes, and quote us probably without permission. I notice that of the new patients who come to my hands since I have been in practice, particularly in the last ten years, they will not mention any names; and there is no necessity for criticising other dentists,

whoever they may be. Sometimes patients will quote our remarks to other dentists, and that will make bad feeling. Now, I want to mention, as bearing on this point, a case that occurred to me five or six years ago. A stranger came to my office early in September, after the vacation was over. He explained to me that he was a lawyer and had had a partial denture made, and that it interfered with speaking; that he spoke in court almost every day, and it was essential for him to have clear articulation. He exhibited the piece to me and explained just how it behaved; that it was a little loose on the inner side near the edge of the plate; and said that he had trouble in forming words ending with s, and had difficulty sometimes to make himself understood, particularly in speaking rapidly. He gave me the name of the dentist who made it, and I told him at once to go back to him and tell him just what he had said to me, and I had no doubt he would make it right, as I declined to touch it. In two or three weeks he came back and said he had done as I wished, but that the dentist said nothing else could be done; and he was not willing to do anything more, and that he had quit with him, and as far as he was concerned the transaction was at an end. I did not like to take up the case at all, but the man was persistent. The name he gave me was that of an acquaintance, and I thought I would communicate with him before doing anything for the man. In a few days I received a letter from the dentist, stating that the first piece of work had not been paid for, and among other things stated that the patient had said to him that I said the work was unscientific. Now, it is a word I never should have used in connection with a denture. He simply invented it. He paid my bill, and I instructed my secretary that whenever that man called to refuse to give him an appointment. That was a case where a man had gratuitously quoted me falsely.

Dr. Huey.—There is one phase that has not been spoken of. Most of us seem to think the Golden Rule requires us to do unto other dentists as we would have them do to us, but how about the patient? I think the patients have to be considered in this matter as well as the dentists. I especially think of a little experience of a patient who had been in my charge, fifteen or sixteen years of age, having pyorrhœa, and when she came to me just after her marriage a few years later, she was in a most deplorable condition. I had her mouth in fairly good condition, when she went to Europe; she returned a few weeks since and certainly three of the teeth will have to be lost. She left her children on the other side. She asked the cause of the condition, and I told her it was because

the tartar had not been removed from them. You sometimes have to criticise even your professional brethren.

Dr. Guilford.—Dr. Huey spoke of the duty we owe patients, and I think it is a very important matter. In most of what has been said it has been from the stand-point of the dentist; that is all right, but we want to consider the patient also. I had a case come to me not long ago, of a lady from another city, having had work done by a dentist there whom I knew very well. She wanted me to look over the teeth and see if anything was needed, and I found at least half a dozen cavities, some of them half-way into the pulp, and that could have been filled easily a year before. I did not say anything about the dentist, but let her draw her own inferences. There is no use of trying to uphold another dentist when he has been careless or done wrong.

Dr. Gaskill presented a plaster cast to the association.

Dr. Essig stated that, in accordance with his promise at a previous meeting, he had sent to the society the transactions of the New York Odontological Society from 1876 to 1892. Also the transactions of the Pennsylvania Society from 1879 to 1883. One or two years of the New York transactions are missing, which it would be well for the members to supply, if possible.

Adjourned.

Editorial.

A GREATER NEED FOR PROFESSIONAL DIGNITY.

THE distinctions drawn in the various positions in life may be of an arbitrary character, yet they are based on experience. That they are misused is true, and individuals are set off into classes from which it is difficult, if not impossible, to rise, as in the older civilizations. This is the extreme abuse of what was originally a natural and, without doubt, a serviceable division.

Training and association have largely to do with the positions occupied in newly-settled communities. The child of poverty and coarse associations may, by the force and upward tendency of education and its refining influence, reach a station in life in the New World not possible in the more conservative elements of the Old.

All this is well understood, but while education and refining

environments may do much to raise to a higher class, it cannot obliterate the strain of inheritance in one generation. This remains and will show itself as plainly in the millionaire as in the lowly-born. It may require generations of wealth to produce that love of refinement so perceptible in lives of quiet, unselfish work, so frequently seen in what are termed the middle class families.

We are led to these prefatory remarks by the observation that the so-called dental profession is in many respects not what it ought to be when viewed as a whole. There are wide differences in individuals, some with a full appreciation of the importance and dignity of their calling, while there is another class who, while appreciating the work and the necessity of ethical culture to maintain its integrity, is still filled with the leaven of earlier surroundings and give to the work and its associative efforts a degree of unrefinement at once unpleasant and oftentimes shocking. There is still a lower class without the slightest regard for the higher life, and this will sacrifice ethics, the good opinions of their fellows, for temporary emoluments. These different classes shade off into each other and have no clearly-defined limitations. While this is true of dentistry, it is by no means confined to it as a profession, but all, theology, medicine, law, and the continually developing newer divisions, have the same unpleasant combinations and perhaps to an equal extent as our own calling. It is not our purpose, however, to labor outside of our own vineyard.

The result of this commingling of the coarser with the more refined produces naturally inharmonious elements. We see it everywhere, and it is possible that there may be no immediate hope of improvement. It may certainly be laid down as a law of professional life that the individual who fails to aspire to the highest qualities attainable, in manners, language, and correct life, is unworthy to wear the professional mantle no matter how many degrees he may have earned from the schools.

The ill-bred man may not render himself specially obnoxious in his own office, but patients will mark a difference, and while for the sake of skill they may bear with unrefinement, it in the end tends not only to individual loss but casts a dark shadow on the profession.

It was through this evil, as much as a lack of thorough medical training, that led dentists of a former era to be regarded with contempt by medical men and with very little respect by the community at large. As this changed there has arisen a higher respect and a more intelligent appreciation of the service performed, and

just in proportion as this refinement is increased will dentistry hold a more advanced position.

The evidence of this unrefined life is more to be found in journals devoted to the interest of trade as distinct from that felt for the profession. The criticism we make does not apply to the higher class of journals of the trade series; indeed, in several it has no place, but in some recent additions the violations of professional good breeding are painfully apparent. Witticisms, whether new or old, have no place in a dental journal, nor should doggerel rhymes and anecdotes from the newspapers relating to dentistry be recognized.

Professional life is a serious thing. There is no time in connection with it for the frivolities common in the jar and tumult of ordinary trade. These may have a proper place in the social whirl, but never in a journal devoted to the higher training of its readers.

The same criticism can be applied, and with equal force, to our associations. It is one of the burdens of editors that they are forced to eliminate all these labored witticisms and out-of-place remarks. If speakers would confine themselves to the subject, and stop when they have finished, there would be a higher standard very soon developed. The funny man has no place in meetings of a scientific character, for these gatherings mean an attempt to find truth, and there is nothing so inappropriate in a serious effort in this direction as the jester's wit, for it is always "much more easy to raise a laugh than to excite admiration by quick wisdom."

Editors of reports of dental societies should unsparingly cut out all irrelevant remarks. If this were faithfully done, dental societies would not be long burdened by such misplaced effusions.

Journals that persist in lowering the standard of dignified expression should be permitted to find their own level, and that will be among those who flourish behind the golden tooth attached to the iron rod, for they can have no place among the self-respecting readers of a dignified literature.

ASBURY PARK AND THE CONVENTIONS.

UPON another page the attention of members of the American Dental Association, as well as societies, is called to the rapidly approaching meeting at Asbury Park, August 6. It is confidently anticipated that this will be one of the largest gatherings this body

has held in years, and we see no reason why this hope should not be realized. The place in many respects is an ideal one for a summer convention, the only drawback being its extreme eastern location.

The Local Committee has secured the large auditorium for the meetings and exhibits. This is located near the board walk and the ocean, and is one of the coolest spots in the Park. It is quite important that the various organizations throughout the country should send delegates. The meetings ordinarily are composed of permanent members, and while this may be necessary to complete the organization, the vigorous life of new blood is sadly needed. Let the various societies see to it that delegates are appointed who will be in attendance.

We are informed it is the intention of the Local Committee to issue a map of the Park and give all necessary information. It is hoped this may include the names and locations of a portion, at least, of hotels and cottages. It is quite important that rooms should be secured some time in advance, for it must be remembered that while Asbury Park is capable of absorbing immense crowds, it is always very full in August.

Obituary.

DR. JOHN J. R. PATRICK.

JOHN J. R. PATRICK, D.D.S., died at his home in Belleville, Ill., on the 10th of April, after a lingering illness, at the age of sixty-seven. Dr. Patrick was born in Liverpool, England, February 6, 1828, coming to this country with his parents when fourteen years of age. The family moved to Keokuk, Iowa, where his father, Dr. Hugh Patrick, died in 1847.

After the death of his father, John, with his mother and others of the family, came to St. Louis, where he learned the trade of a goldsmith. He followed this calling for several years, both in St. Louis and New Orleans. He later studied dentistry with his brother, and after attending one course of lectures in the McDowell Medical College, commenced the practice of dentistry in St. Louis.

Dr. Patrick married Miss Jane Johnston in 1853, and removed to Belleville, Ill., where he has resided ever since up to the time of

his death. During the war of the Rebellion the doctor served as captain of Company G, One Hundred and Thirtieth Illinois Infantry Volunteers, from January 23, 1863, to January 14, 1865, being mustered out of service upon the consolidation of his regiment with the Seventy-seventh Illinois. At the time of his death, and for several years previous, he was a member of the Grand Army of the Republic and of the Illinois Commandery of the Loyal Legion. For many years the doctor interested himself in the study of palaeontology, spending much time and money in this pursuit. He had the Indian mounds, which are numerous in St. Clair County, surveyed, and models made to scale of many of them. These are now in the scientific collections of this and many other countries.

The Patrick collection of prehistoric crania, together with much other matter of interest from these mounds, is now in the collection of the Missouri Historical Society in St. Louis. For the past fifteen years the doctor has interested himself more in the line of his profession, which he has enriched by many papers upon subjects pertaining to dentistry, as well as by the invention of numerous instruments and appliances which are in use the wide world over.

Dr. Patrick has contributed much to the advancement of the dental profession in this country, and especially in the West and South, where few men were better known, and none more heartily welcomed.

The doctor was taken sick in January, 1894, but rallied from this, and on July 17 was apparently well, when he was taken with sciatic rheumatism, and other complications followed.

He was married March 15, 1895, to Miss Annie Rischer. Besides a wife, he leaves a brother, Dr. Hugh Patrick, in Lyons, France, and another, Andrew Patrick, at Liberty, Mo.

DR. A. H. FULLER, in the *Western Dental Journal*.

DR. LUDWIG ADOLF WEIL.

DIED in Munich, April 13, 1895, in his forty-sixth year, Dr. Ludwig Adolf Weil, privat docent at the University. He was also court dentist.

Dr. Weil, after completing the severe medical training required in Germany, came to this country and graduated in dentistry at the Pennsylvania College of Dental Surgery. He has since then closely followed scientific work, and his name has become known through-

out the dental profession for original investigation and new processes in histological work.

His death occurred after a protracted illness of three months. His funeral took place on April 15, 1895.

Current News.

CHICAGO DENTAL SOCIETY.

THE following are the officers of the Chicago Dental Society for 1895:

President, W. V. B. Ames; First Vice-President, C. E. Bentley; Second Vice-President, J. A. Dunn; Secretary, A. H. Peck, 65 Randolph Street; Corresponding Secretary, H. A. Costner; Treasurer, E. D. Swain; Librarian, H. A. Gunther.

Board of Directors.—G. H. Cushing, *chairman*, J. N. Crouse, J. G. Reid.

Board of Censors.—D. C. Bacon, *chairman*, H. W. Sale, E. R. Carpenter.

Committee on Exhibits.—G. B. Perry, *chairman*.

H. A. COSTNER,
Corresponding Secretary.

MISSOURI STATE DENTAL ASSOCIATION.

THE Thirty-first Annual Meeting of the Missouri State Dental Association will be held at Pertle Springs, July 9 to 12, 1895, inclusive. All dentists in Missouri are especially invited to attend, and a cordial invitation is extended to those of other States. It is expected that this will be one of the most interesting meetings in the history of the Association.

W. M. CARTER,
Corresponding Secretary.

SEDALIA, MO.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE next meeting will be held in the parlors of the Hotel Columbia, Asbury Park, N. J., on Monday, August 5, at ten A.M., and at other times during the week as becomes necessary between the sessions of the American Dental Association. It is important that every State Board be represented. Applications from Boards not in membership will receive immediate attention.

CHARLES A. MEERER, D.D.S.,

Secretary.

29 FULTON STREET, NEWARK, N. J.

PENNSYLVANIA STATE DENTAL EXAMINING BOARD.

THE Pennsylvania State Dental Examining Board will hold its next annual meeting at Eagle's Mere, Pa, July 9, 1895.

W. E. MAGILL, Erie, Pa.,

President.

J. C. GREEN, West Chester, Pa.,

Secretary.

NEW JERSEY STATE DENTAL SOCIETY.

THE Twenty-fifth Annual Meeting (the silver anniversary) of the New Jersey State Dental Society will be held in the "Auditorium," Asbury Park, commencing Thursday, August 1, at ten A.M., and continuing through Friday, Saturday, and Monday, closing in time for the meeting of the American Dental Association, commencing Tuesday, August 6, at ten A.M.

The "Auditorium" is the ideal place for holding a summer dental meeting, being situated in the middle of an entire block fronting the surf, with large windows opening from every side in one continuous row, thirty large windows with north light for clinics, and 390 x 25 feet for exhibits.

A branch of the Asbury Park Post-Office will be established in the "Auditorium," and a bureau for general information, with attendants constantly on hand.

The New Jersey head-quarters will be in the Hotel Columbia, with rates from \$2.50 to \$3.00 per day; several large hotels have made contracts from \$2.50 to \$4.00 per day, and smaller hotels from \$8.00 to \$12.00 per week board.

Full particulars and rates, with map of Asbury Park and a plan of the "Auditorium," will appear in the programme.

CHARLES A. MEEKER, D.D.S.,
Secretary.

29 FULTON STREET, NEWARK, N. J.

AMERICAN DENTAL ASSOCIATION.

THE American Dental Association holds its next meeting at Asbury Park, N. J., Tuesday, August 6, 1895. I am requested by the President, Dr. J. Y. Crawford, to give notice that it is the privilege and duty of each State and Local Society to appoint and send delegates to the American Dental Association.

Each State and Local Society which has adopted substantially the same code of ethics as that governing the conduct of members of the American Dental Association is entitled to one representative for every five members and fractional part thereof.

Blank certificates for delegates may be had on application to the Corresponding Secretary.

Many questions of interest will come up for discussion at this meeting, and every Dental Society in the United States should be fully represented in this, our National Convention.

EMMA EAMES CHASE,
Corresponding Secretary.

APRIL 27, 1895.

MASSACHUSETTS DENTAL SOCIETY.

THE Thirtieth Annual Meeting of the Massachusetts Dental Society will be held in Boston, at the rooms of the Harvard Dental School, beginning on Wednesday, June 5, at two o'clock, P.M., and continuing through Thursday, June 6. *Mark these dates off your appointment book now*, and plan to be with us. The annual dinner will be at Young's Hotel at six o'clock on Wednesday; tickets \$1.50

a plate; ladies invited. There will be a number of interesting clinics and exhibits, which will well repay your attention. The councillors will meet promptly at the same place at 9.30 A.M., Wednesday, to transact the business of the Society, so that the entire time of the Society may be given to papers, discussions, etc.

JOS. KING KNIGHT,

President.

EDGAR O. KINSMAN,

Secretary.

WOMEN'S DENTAL ASSOCIATION.

THE Third Annual Meeting of the Women's Dental Association was held at the office of Dr. Mary H. Stilwell, 1300 Arch Street, Philadelphia, Saturday evening, March 2, 1895.

The following officers were elected for the ensuing year: Dr. Anna T. Focht, President; Dr. Elizabeth A. Davis, Vice-President; Dr. Emily W. Wyeth, Recording Secretary; Dr. Mary H. Stilwell, Corresponding Secretary; Dr. Matilda Groth, Treasurer.

Executive Committee.—Drs. Eliza Yerkes, Bertha Jarret, Maria Lasser, Hannah M. Miller, and Martha C. Corkhill.

Vice-presidents from representative States were re-elected. Total membership, forty-two.

EMILY W. WYETH,

Recording Secretary.

Selections.

DIODIFORM.

La Presse Médicale for February 24 contains an article by M. L. Maquenne, in which he remarks that, owing to the strong and persistent odor of iodoform, a large number of physicians have been obliged to do away with it in their private practice. For a long time they have searched for a drug to replace it which would produce the same effects, and without the disagreeable odor; but it has been difficult to find one with an organic combination com-

parable to iodoform with regard to the abundance of iodine it contains and to its physiological action. Diiodoform, which is not to be confounded with the deodorized iodoform of commerce, is entirely satisfactory in this respect. It is a definite iodide of carbon, which answers to the formula C_2I_4 ; it is derived from ethylene or olefiant gas, and should be called, according to the rules of chemical nomenclature, periodized ethylene. It will be seen that it differs from iodoform, CHI_3 , in containing no hydrogen and containing twice as much carbon; theoretically, it may be considered as a product of the condensation of iodoform in which two particles are united with loss of hydriodic acid. This, as well as its known physiological properties, has caused it to be commonly known as diiodoform. Its centesimal composition is extremely like that of ordinary iodoform, as will be seen by the following comparison:

	Iodoform.	Diiodoform.
Iodine	96.70	95.19
Carbon	3.05	4.81
Hydrogen	0.25	0.00
	<hr/> 100.00	100.00

The quantity of iodine is very nearly the same, exceeding greatly that contained in iodol and aristol, which are sometimes used instead of iodoform. This explains the analogy of the action of these two substances and their undisputed superiority over all other antiseptics having iodine for their base. Diiodoform is a yellow substance, almost entirely odorless in an ordinary temperature, which melts at 377.6° F., and becomes decomposed into its elements, carbon and iodine, under 392° F.; it is perceptibly volatile when heated, and can be sublimed. Completely insoluble in water, slightly soluble in alcohol, diiodoform is easily dissolved in carbon disulphide, in chloroform, in benzene, and in the majority of hydrocarbons, and it is deposited in the form of beautiful prismatic needles, which are pulverized for use like iodoform crystals. Experience has shown that it is well borne by the stomach, and that it is practically non-poisonous. With regard to its germicidal action, it is the same as that of iodoform.—*i.e.*, rather weak.—*New York Medical Journal*.

THE International Dental Journal.

VOL. XVI.

JULY, 1895.

No. 7.

Original Communications.¹

THE HISTORY OF THE CUSPS OF THE HUMAN MOLAR TEETH.²

BY HENRY FAIRFIELD OSBORN.³

MR. PRESIDENT AND GENTLEMEN,—I wish to congratulate the members present upon the formation of this *Institute of Stomatology*. It seems to me to mark one of the stages in the remarkable specialization of human knowledge when, at the present time, it is proposed to devote the work of an entire society to the scientific study of the mouth parts, as I understand your object to be; and I also gather from the fact that you have asked me, as a comparative anatomist, to deliver an address this evening, that you look at the subject in two ways,—from the stand-point of applied or practical science and from the stand-point of theory. It is on the theoretical side that I should like to bring before you this evening the *history or origin of the cusps of the human molar teeth*.

We take up this skull of an Eskimo, and you will observe that the teeth are slightly worn, and that the molars have four cusps.⁴ Half a century ago this would have been considered as

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Address before the New York Institute of Stomatology, April 19, 1895.

³ Da Costa Professor of Biology, Columbia College, New York.

⁴ E. D. Cope, "On the Tritubercular Molar in Human Dentition," *Journal of Morphology*, July, 1888, p. 7.

something ultimate, simply as an adaptation to human diet; but now that we have come to understand the doctrine of evolution, we ask ourselves, What is the meaning of these cusps? what is their history? what is their origin? Now, these four cusps which are present on the four corners of the teeth might be explained by evolution in three ways. We might imagine that the crown of the tooth was originally a low rounded summit, and that on the summit these four cusps appeared at each angle: no one has advocated this. Or we might imagine that they represent the coming together of a number of tips of pointed teeth, such as we see in the jaw of this member of the dolphin family; this is the theory which has been recently advanced in Germany, and it has been called the "*cusp concrescence*" theory. Or, again, we might imagine that these cusps have originated by a gradual addition to the sides of a primitive single cone; this we call the "*cusp differentiation*" theory, or the theory of cusp addition, in distinction from concrescence. The differentiation theory is supported by Cope, by myself, and others in this country.

Now, suppose an evolutionist were to trace back the history of the monkeys and of other animals among their fossil ancestors, he would find that the further back his researches extended the more simple the types of the teeth would be; he would find that the teeth of the oldest types of ancestral mammals have a simple conical form, the form that is preserved in the teeth of the whales and the dolphins of the present day, or in the Edentates, as represented in the group to which the sloth and the armadillo of South America and South Africa belong. (Fig. A.)

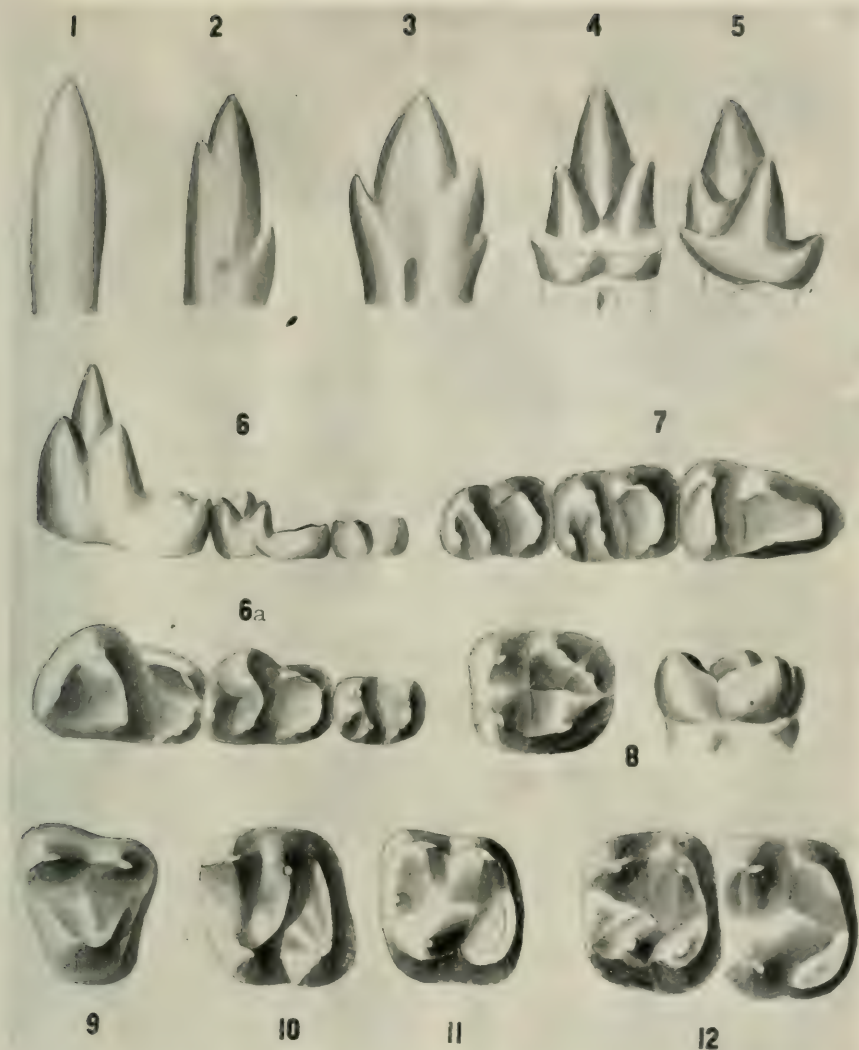
FIG. A.



section of the upper and lower jaws of a dolphin, showing the alternation of simple conical teeth of the reptilian type.

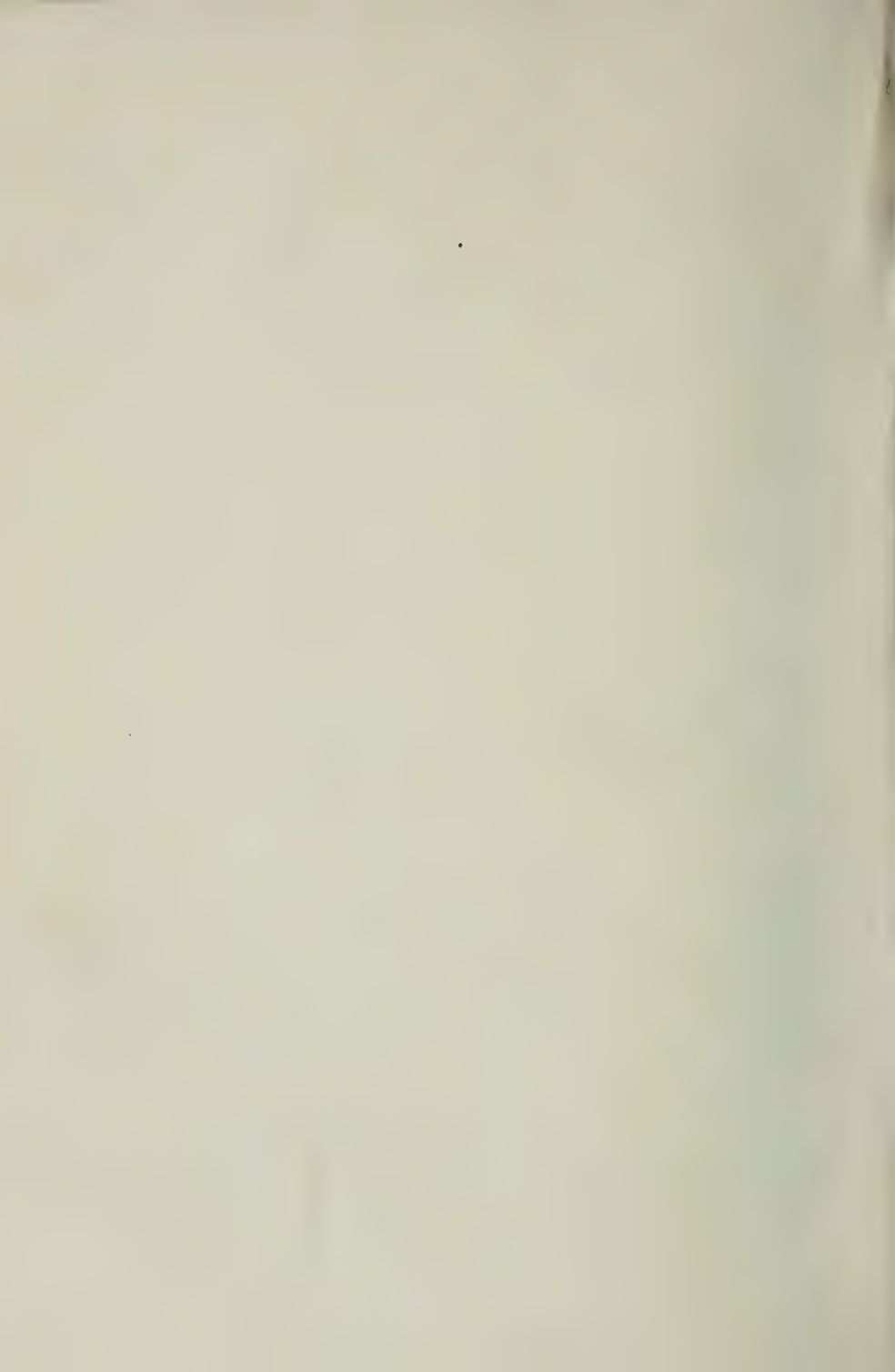
We have the same type of conical tooth preserved in the human canines, and if we turn from the teeth of man, in which the canine has almost entirely lost its original laniariform or flesh-tearing shape, to that of the lower monkeys, we see that the canine is really a pointed tooth; so that we may draw a suggestion from this fact that all the teeth of the series at one time were pointed.

PLATE AA



LOWER MOLARS.—1, reptilian conical tooth; 2, tooth with lateral cuspules, *Dromatherium*; 3, tooth with lateral cusps, *Microcanodon*; 4, tooth with lateral cusps turned inward, *Spelaeotherium*; 5, tooth with cusp triangle and heel, *Amphitherium*; 6, internal view and crown view of three molars in the right jaw of *Momys*; 7, crown view of three molars in the right jaw of *Amphitherium*; 8, crown and internal views of an unworn human molar.

UPPER MOLARS (crown views).—9, *Anaplanorhina*; 10, an upper Eocene monkey; 11, Eskimo; 12, European.



It is moreover true that wherever we find these pointed teeth they are present in the jaw in large numbers, sometimes sixty or seventy on one side and usually running far back into the mouth, and it is this fact which led to the suggestion of the theory of "concrecence" in the formation of molar teeth.

THE CONCRESCENCE THEORY.

You might at this stage be not inclined to take this "concrecence theory" seriously, but my address has been suggested largely by the fact that it has been taken very seriously by some well-known anatomists in Germany; as seen in the position of Professor Schwalbe,¹ in a recent article, in which he reviews the entire literature in regard to the formation of teeth published during the past fourteen or fifteen years, and concludes that in the concrecence theory and the differentiation or cusp addition theory the evidence is so evenly balanced that he cannot decide between them. It is, therefore, a question *sub judice*, and worthy of the attention of odontologists. As to the source of this theory, it was proposed simultaneously by two Germans, both of whom claim the credit of originating it. One is Dr. Carl Röse, a physician of Freiburg, a man of fine powers of research and great energy, since he has, during the past few years, issued in rapid succession a series of valuable papers on the embryological development of the teeth, which place him in the front rank of students of this subject in this decade. The other is Professor W. Kükenthal, of Jena, whose views sprang principally from the study of the teeth of whales. While these two writers are in doubt as to which should enjoy the precedence, I find, in correspondence with my friend Dr. Ameghino, of the Argentine Republic, also originally a physician and now a distinguished palaeontologist, that he promulgated this theory as far back as 1880. In a work which he published at that time, entitled "Filogenia," he says, "For the reasons we are about to give it is evident that all mammals which possess compound teeth have in past periods possessed a very much larger number of teeth, but of quite simple conical form, like those of the modern dolphin. The most primitive mammals must also have had a number of very elevated teeth, but it is difficult at the present time to determine how large this number was. Nevertheless, if we take as an example a mammal in which the dentition is

¹ "Ueber Theorien der Dentition." Anatomischer Anzeiger Centralblatt, 1894.

complete, as in the *Macrauchenia*¹ or in the horse, and if we reduce the number of its compound teeth, we find that the most remote ancestors of these forms must have possessed more than one hundred and fifty teeth. This number is certainly not exaggerated, because *Prionomys*, the giant tatusia, a mammal in an already quite advanced stage of evolution, possesses nearly one hundred simple teeth, and in the dolphin this number rises from one hundred and fifty to one hundred and seventy." I read this to show that if there is any truth in the concrescence theory, Dr. Ameghino partly deserves the credit for it. Moreover, we learn from Schwalbe that the same theory was advanced by Professor Gaudry in 1878, and still earlier by Professor Magitot in 1877.

Now let me illustrate, in a very simple manner, what is meant by the theory of concrescence and how we can imagine that the human molars have been built up by bringing together a number of isolated teeth. Placing a number of conical teeth in line, as they lie in the jaw of the whale, they would represent the primitive dentition. In the course of time a number of these teeth would become clustered together in such a manner as to form the four cusps of a human molar, each one of the whale-tooth points taking the place of one of the cusps of the mammalian tooth,—in other words, by a concrescence, four teeth would be brought into one so as to constitute the four cusps of the molar crown. Vertically succeeding teeth might also be grouped.

FIG. B.



Fragmentary lower jaw of a Jurassic mammal, *Amphilestes*, showing five triconodont molars, with three cusps in line. Greatly enlarged.

Now, what evidence is there in favor of this theory, and what is there against it? First, there is this, that all primitive types of

¹ This is one of the peculiar extinct South American hoofed animals.

reptiles from which the mammals have descended and many existing mammals, as we have noted, have a large number of isolated teeth of a conical form; secondly, we find that by a shortening of the jaw, the dental fold or embryonic fold, from which each of the numerous tooth-caps is budded off in the course of development, may be supposed to have been brought together in such a manner that cusps which were originally stretched out in a line would be brought together so as to form groups of a variable number of cusps according to the more or less complex pattern of the crown.

What may be advanced against this theory? This, and it is conclusive to my mind: we find at the present time that cusps, quite similar in all respects to each of the cusps which form the angles of the human molar, are even now being added to the teeth in certain types of animals, such as the elephant, whose molar teeth cusps are being complicated now or until very recent times. Then we find in the mesozoic period certain animals with tricuspid teeth. Now, according to the theory of conerescence these teeth ought not to show any increase of cusps in later geological periods; but as we come through the ages nearer to the present time we find that the successors of those animals show a very much larger number of cusps. How is this increase of cusps to be accounted for? Has there been a reserve store of conical teeth to increase the cluster? No. Most obviously, to every student of the fossil history of cusps there is no reserve store, but new cusps are constantly rising up on the original crown itself by cusp addition.

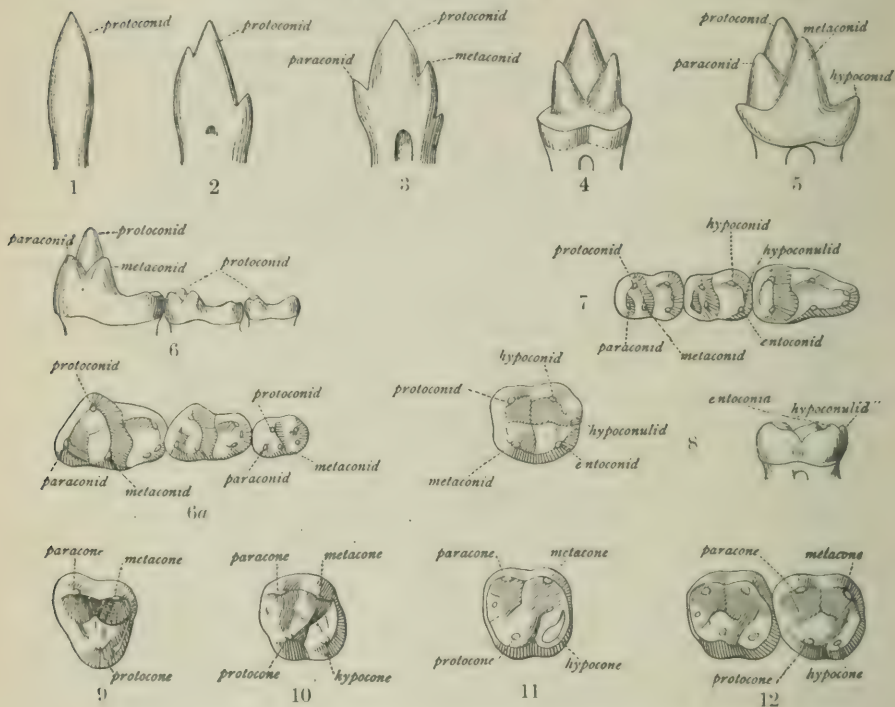
However, do not let me give you the impression that these researches of Rösé and Kükenthal are not of the greatest value and interest: we shall see later on how the very facts of embryology which are advanced by Dr. Carl Rösé in support of his hypothesis can be turned against him and used to support the differentiation theory.

THE DIFFERENTIATION THEORY.

Now let us turn to the differentiation theory and see what evidence we have of that. Let us go back to a very remote period of time, through the geological ages of the Pliocene and the Miocene, through the Eocene, through the Cretaceous or chalk period, and even the Jurassic. Still further back we go to the Triassic, and the interval between this and the present period has been estimated at over ten million years. Now, in the Triassic we find

the mammalia, or the first animals which we can recognize as mammalia, possess conical, round, reptilian, or dolphin-like teeth. There are also some aberrant types which possess complex or multitubercular teeth.

KEY TO PLATE AA.



These teeth begin to show the first traces of cusp addition, as shown in the plate at the beginning of this article and in the accompanying key to this plate.

Here (Fig. 1) we have represented the teeth of the *Dromatherium*, an animal found in this country in the coal-beds of North Carolina, and on the sides of the main cone are cusps or rudimentary cuspules. In this enlarged model you see that on either side of the main cone are two cuspules. These teeth were found six hundred feet below the surface in a coal-mine, and in the same mine we find another animal, represented by a single tooth here (Fig. 2), in which these cusps are slightly larger. These cusps have obviously been added to the side of the tooth, and are now growing. Then we pass to teeth of the Jurassic period, found in

large numbers both in America and in England, but still of very minute size; and we observe the same three cusps, but these cusps have now taken two different positions; in one case they have the arrangement represented in Fig. B, page 392: the middle cusp is relatively lower, and the lateral cusps are relatively higher; in fact, these cones are almost equal in size; these teeth are termed *triconodont*, as having three nearly equal cones. But associated with this of *Triconodont* is another animal named *Spalacotherium*, the teeth type of which are represented in Fig. 4. This is one of the most significant teeth which we have among all the fossil series, because this tooth illustrates the step that was taken in the transformation of a tooth (triconodont) with three cusps in line to a tooth with three cusps forming a *triangle*: for the primitive cusp is now seen to be the apex of a triangle, of which the two lateral cusps are the base. Now, this fact in itself is of great significance, because this tooth in this single genus is the key of comparison of the teeth of all mammalia of the great class to which man belongs. By this we are able, as you shall see, to determine that part of a human molar which corresponds with a conical reptilian tooth.

The stage shown you is the triangle stage; the next stage is the development of a heel or spur upon this triangle, as you see in Fig. 5, *Amphitherium*. To sum up: we have a reptilian cone, two cusps added to it, and a heel,—four cusps altogether, and we shall now see what relation these bear to the human molar.

First let us turn to some transitional forms. Examine a molar of the living opossum, a marsupial, which still distinctly preserves the ancient triangle. Look at it in profile, in side, or in top view, and see that the anterior part of that tooth is unmodified. This triangle we also trace through a number of intermediate types.

In this figure (Fig. 6) of *Miacis*, a primitive carnivore, we observe a high triangle and a heel, and when we come to look at it from above (6a) we find that the heel has spread out broader, so that it is as broad as the triangle. Now, the three molars of this animal illustrate a most important principle,—namely, that the anterior triangular portion of the crown has been simply levelled down to the posterior portion of the crown. Compare these three teeth, therefore, and you see illustrated a series of intermediate steps between a most ancient molar and the modern molar of the human type. The second tooth is half-way between the first and third. Look at the second molar from above and you see it has exactly the same cusps as the first, so it is not difficult to recognize that each cusp has been directly derived from its fellow. Now direct

attention to the third tooth of the series (Fig. 7), for it is of equal significance with the others. This tooth has lost one of its cusps: it has lost a cusp of the triangle. It is now a tooth with only half the triangle left on the anterior side, and with a very long heel. That tooth has exactly the same pattern as the lower human molar tooth (Fig. 8); the only difference is that the heel is somewhat more prolonged. These teeth belong to one of the oldest fossil monkeys, *Anaptomorphus*.

I have no doubt many of you have observed, in the examination of human lower molars, that occasionally instead of having four cusps they have five. The fifth cusp always appears in the middle of the heel, does it not, or between the posterior lingual and the posterior buccal? You find this in the monkeys and in many other mammals, but I know of no record of the ancient anterior lingual reappearing.

So we see that the human lower molar tooth with its low, quadrubercular crown has evolved by addition of cusps and by gradual modelling from a high-crowned, simple-pointed tooth. Now this, and I say it with great confidence, is what has actually taken place. It has not come about by bringing together single reptilian cones; it has been simply by the addition of one cusp after another to an original single reptilian cone until there were six cusps, and then, in the adaptation and fitting of the lower teeth to the upper, one of the cusps has disappeared. This cusp was the primitive anterior lingual, or, in comparative anatomy, the *paraconid*.

Now let us follow the history of the upper teeth and see why the "primitive anterior lingual," or *paraconid*, in the lower jaw has disappeared.

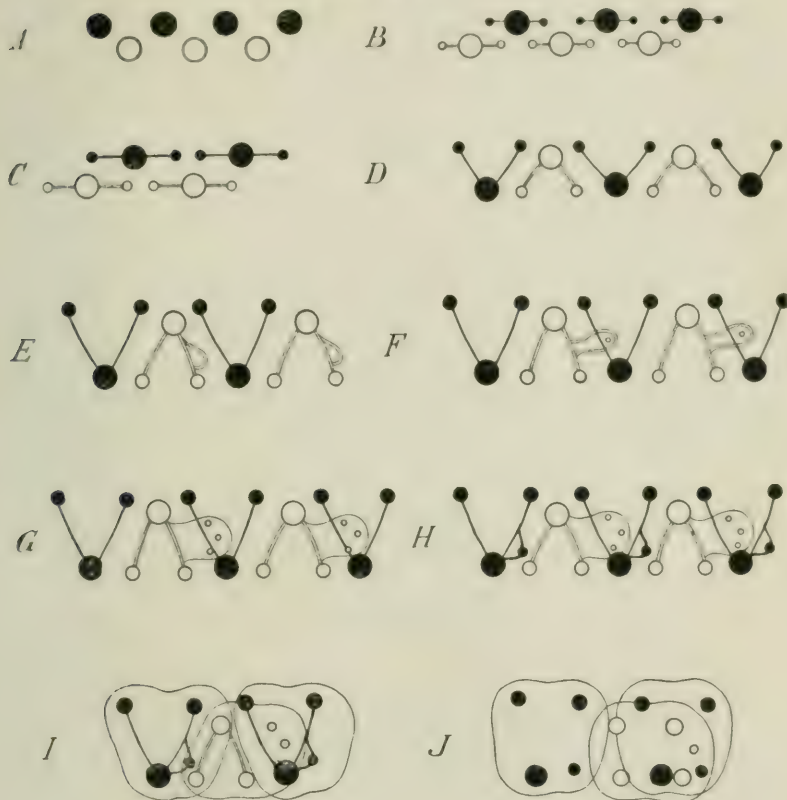
You are constantly, in your practice, observing that one tooth in the lower jaw gets into the way of another tooth and has to be pushed out of place in order to place its opponent in the upper jaw into its proper position. This is exactly what Nature has done; Nature has abandoned that lower cusp simply because, in the simultaneous transformation of the upper teeth from a three-cusp to a four-cusp type, there was no room for it.

MECHANICAL RELATIONS OF THE UPPER AND LOWER TEETH.

Let us examine the upper teeth. We must say, in the first place, that our evidence here is not nearly so complete, because a lower jaw, from its thin nature, is more apt to be preserved fossil than an upper jaw; so that in the older rocks we meet with ten lower jaws to one upper jaw, and we cannot get the same evidence

as to the history of the upper jaw that we have of the lower; but although we are not able to trace the history of the upper teeth with the same accuracy or degree of certainty, we have every reason to think it was the same. We find the upper teeth shaped

PLATE BB.



MECHANICS OF CUSP ADDITION (DIAGRAMMATIC).

Compare with shaded figures in Plate AA and Key.

A, the conical stage (Fig. 1); *B*, *C*, the triconodont stages (Figs. 2, 3); *D*, the first triangular stage (Fig. 4); *E*, *F*, *G*, the triangular upper molar, the lower molars, with triangle and heel (Figs. 5, 6, 7, 9); *H*, *I*, upper and lower molars, with triangle and heel; *J*, human type, upper molars, with four cusps, triangle, and heel (Figs. 10, 11, 12); lower molars, with five cusps, antero-internal cusp having disappeared (Fig. 8).

like a *triangle*, as in Fig. 9, so we may imagine that the same triangle which was formed in the lower jaw was formed in the upper jaw, with this important difference, that in the upper jaw the base

of the triangle was turned outward, whereas in the lower jaw the base of the triangle was turned inward.

What I mean by this is illustrated in the accompanying Plate BB, Figs. *A—J*, which are an epitome of the whole history. The upper teeth are represented solid, the lower teeth as hollow circles.

In *A* we see a row of single cusps, the lower somewhat inside of the upper. In *B* the lateral cusps are added. In *C* they are enlarged. In *D* the cusps are pushed outward and inward into triangles. In *E* a spur is added on the lower molar triangle, which in *F* and *G* grows out into a broad heel. In *H* and *I* a spur appears upon the upper molar triangle, and in *J* this causes the lower molar triangle to lose its anterior cusp. Nature has corrected any possible interference between these triangles in a simple manner by turning the base of the triangle of the upper molars outward towards what you call the buccal side. In the lower jaw, on the other hand, the base of the triangle is turned inward to the lingual side, so that finally we have the two triangles alternating, coming together as in *D* and making a beautiful cutting mechanism; because if any food gets in between these triangular shears the food tends to press these teeth forward and backward, therefore crowding the teeth more closely together and tending to tighten and improve the shear, whereas if the teeth were placed in line, as in *C*, and food were to get in between, the effect would be to crowd the two jaws apart and lessen the exact cutting power of the shear.

FIG. C.



Lower teeth in the left jaw of a seal, *Leptomyx leopardinus*, showing five triconodont pre-molars and molars, with three cusps in line.

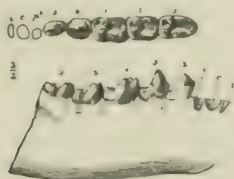
Now we see that we can compare the lower and upper triangles to each other. How about the heels or spurs, and why were they developed? They were developed because these animals required crushers as well as cutters; they required to break up their food, and consequently a crushing surface was developed in each heel. In the course of time the animal gave up its cutting and tearing function, and in all the group of animals to which man belongs it

acquired a purely crushing function, as seen in the teeth of the baboon. As that became necessary, the next step was to transform the entire upper tooth into a crusher as well as the lower, and to fill out all the spaces between them, so that a square lower tooth would abut against a square upper tooth, as in *J*, and this was done by simply adding a heel to this tooth. Now, what would that heel come against in *I*? It would come against the anterior cusp of the lower triangle; therefore that cusp had to be removed, so when the upper heel was developed this lower cusp was removed and the lower molar, which had six cusps, presented only five; then the second lingual cusp was pushed forward, as in *J*, and the tooth was transformed into a quadritubercular molar.

EVIDENCE THAT THE UPPER HUMAN MOLARS WERE TRIANGULAR.

How do we know that is so? We have some conclusive evidence of it in other animals of the group to which man belongs. Beginning with the lemurs, the lowest type of monkeys, and entirely separate in many respects from the higher types, we find almost without exception that the upper teeth are triangular, there being no posterior cusp, so that Fig. 9, Plate AA, accurately

FIG. D.



External view of lower jaw and crown view of teeth of a lower Eocene monkey, *Anaptomorphus homunculus*. One and a half natural size. Collection Am. Mus. Nat. Hist.

represents a tooth of the lemurs, and it also represents the tooth of the true monkeys which we find in the Eocene period; in other words, all monkeys or all primates of the group to which man belongs had at the outset this triangular upper molar. Then earlier or later in the Eocene or Miocene the spur began to be developed which transformed a three-cusp tooth or a triangular tooth into a quadritubercular tooth. That spur became enlarged and finally, in civilized races of men, we have a tooth of this form as the prevailing type of tooth. These stages are shown in Plate AA, Figs. 9, 10, 11, 12.

Now, we might say that the evidence is not perfectly satisfac-

tory, because we have no positive reason for believing that the human teeth were derived from such a type as this; they may have come along another line of descent, and for that reason we have to show here, through the kindness of one of the members of the dental profession in this city, the teeth of an Eskimo, which, as Professor Cope has pointed out, differ from the teeth of all negroes, all Indians, and all the lower races of men, in presenting in a much clearer manner the primitive triangular arrangement of the cusps that characterize the lemurs. A friend has just been telling us what very few of us knew,—that the Eskimos do not chew their food: they simply swallow it whole or gulp it down; and their food consists largely of blubber. Blubber does not form much resistance to the teeth, and, whether as a mechanical or an inherited effect of the lack of resistance of soft food through many generations of blubber-eating Eskimos or not, the teeth of these Eskimos are exceptionally *tritubercular*. This fact was pointed out by Professor Cope in his article entitled, "Lemurine Reversion in Human Dentition."¹

Up to a certain point in their evolution the molar teeth of all mammals followed exactly the same route. It follows that if we once grasp the principles of cusp addition upon this triangular ground plan we can compare the cusps of the molars of man with those of any other mammal. In the teeth of the bear, for example, the homology is very obvious indeed. But in the teeth of the cat the homologies can only be determined when we procure the ancestral forms of cats, for in the evolution of the large sectorials many cusps have degenerated. Some years ago, when I had fully demonstrated the truth of Cope's theory by my own studies, I saw the importance of using a set of standard terms for the cusps. These have since been almost universally adopted by comparative anatomists, but have not as yet, I believe, made much headway among human odontologists. They are as follows, as applied to the human teeth:

UPPER MOLARS.

Anterior palatal	Protocone	} Primitive triangle, or "trigon."
Anterior buccal	Paracone	
Posterior buccal	Metacone	
Posterior palatal	Hypocone	Primitive heel, or "talon."

¹ Journal of Morphology.

LOWER MOLARS.

Anterior buccal	Protoconid	} Primitive triangle, or "trigonid."
Anterior lingual	Metaconid	
Posterior buccal	Hypoconid	} Primitive heel, or "talonid."
Posterior lingual	Entoconid	
Posterior mesial	Hypoconulid	

When we understand that all the teeth of all mammals have this key, this tritubercular key, we can unlock the comparisons through the series and point out the homologies.

There is further evidence in support of the theory of cusp addition which I will now briefly mention. It is that brought forth by the very investigations of Dr. Carl Röse, which he has used to support the conerescence theory. We should expect, in the embryonic jaw that the calcification of the tooth-germ would be very significant, because we know that the embryonic structures in their development follow the order of addition or evolution. The order of evolution is, to a certain extent, repeated in embryonic development. How is it with the teeth? Dr. Röse has given a most exact account of the mode of calcification of the tooth-germ within the jaw; this is also now to be had in the form of wax models, prepared by Professor Zeigler, of Freiburg.

To begin with the lower molars, the dental cap in the jaw forms a broad, saucer-like surface, and then at the corners of that cap calcified points appear. In what order do they appear? The order is shown in the following table:

COMPARISON OF EVOLUTION AND EMBRYONIC DEVELOPMENT.

	Order by "Cusp Addition Theory."	Order of Embryonic Development.
UPPER MOLARS	1. Anterior palatal.	1. Anterior buccal.
	2. { Anterior buccal.	2. Anterior palatal.
	{ Posterior buccal.	3. Posterior buccal.
	4. Posterior palatal.	4. Posterior palatal.
LOWER MOLARS	1. Anterior buccal.	1. Anterior buccal.
	2. Anterior lingual.	2. Anterior lingual.
	3. Posterior buccal.	3. Posterior buccal.
	4. Posterior lingual.	4. Posterior lingual.
	5. Posterior mesial.	5. Posterior mesial.

In the lower molar teeth the order of calcification is precisely the order of evolution,—in other words, the anterior buccal was the first to evolve, representing the reptilian cone; it is also the

first to calcify. The anterior lingual is the second in age and also the second to calcify. The third and the fourth cusps calcify almost simultaneously. So we find that the order of embryonic development exactly repeats the order of historical development and in every way presents the strongest kind of confirmation of the theory of cusp formation which we have been discussing. But this you see is not exactly the case in the upper molars. Nevertheless, out of eight cusps in the upper and lower molars considered together, *six* cusps calcify in the order in which they were successively added to the single reptilian cone.

Gentlemen, I trust that I have not in this address taken you too far afield. I have reached a conclusion on this subject which could be elaborated in much greater detail. In closing, I would like to refer to the work of Dr. J. L. Wortman, who is here this evening, and who was for some years a collaborator with Professor Cope in Philadelphia, and who in association with Professor Cope had quite a share in the establishment of the "tritubercular or cusp addition" theory. This theory is now a rival to the "concrecence" theory; and, while it may not seem a matter of great importance, if the concrecence theory may not seem one we ought to take seriously, still, in view of the attention which it has gained in Germany, it is time that we produce and bring forward the unimpeachable evidence which we get of the history of these teeth from the rocks, the solid evidence from the geological formations, the evidence of comparative anatomy, which, as we have just seen, is so far supported by the evidence of embryonic development.

BIBLIOGRAPHY.

Works of reference in addition to those cited above:

Röse, "Ueber die Entwicklung und Formabänderung der menschlichen Molaren." *Anatomischer Anzeiger*, Band vii., 1892.

Kükenthal, "Ueber den Ursprung und die Entwicklung der Säugethierzähne." *Jenaische Zeitschrift für Naturwissenschaft*, Band 28, 1893.

Osborn, "The Evolution of Mammalian Molars to and from the Tritubercular Type." *American Naturalist*, 1888, p. 1067.

"The History and Homologies of the Human Molar Cusps." *Anatomischer Anzeiger*, vii., 1892, pp. 740-747.

Cope, "The Mechanical Causes of the Development of the Hard Parts of the Mammalia." *Journal of Morphology*, iii., 1889.

THE APPLICATION OF SOME PRINCIPLES OF LAW TO THE PRACTICE OF DENTISTRY.¹

BY W. A. PURRINGTON, ESQ., NEW YORK.²

MR. PRESIDENT AND MEMBERS OF THE ODONTOLOGICAL SOCIETY,
—It would be impossible for me to treat at length the topics enumerated in the syllabus of this paper unless I should read to you a volume. The most that I can hope to do is to present with a little detail what is most interesting to you, the legal status and regulation of your profession, and to treat other topics with a very broad brush. It is a fundamental principle that every man should be allowed to earn his livelihood by following any calling for which he is fitted and in which he gives satisfaction to those employing him; the individual, as a rule, knowing much better than the State what is good for him and the value of services rendered by and to him. It is also an accepted principle that, under the police powers, the State has a right to make general laws for the punishment of fraud and imposture, and to protect the general health and welfare. But it is no business of the State to interfere with the private concerns of the citizen in order to secure for him a monopoly in business, to protect him from competition, to increase his dignities, or to do for his individual advantage anything that is not necessary, or, at least, conducive to the common welfare. These are trite sayings, yet they cannot be too often emphasized; for, like many other formulæ, they may be learned by rote with little appreciation of their full significance.

The question of limiting by license laws the right to practise medicine has been discussed hotly for very many years. When the people are bent on following certain courses, or employing certain persons, or entertaining certain opinions, or reading certain books, legislation cannot stop them. The laws of England, the power of the College of Physicians, the decisions of the Court of King's Bench, all failed to suppress the recalcitrant apothecary Rose, who dared to prescribe a bolus to Searle, the butcher, in defiance of the physicians and the law. Beaten in the law courts, Rose took his case into the House of Lords, and there obtained a decision in his favor, which, however illogical in law, was entirely comprehensible from the stand-point of those who saw only an intolerable burden in a system

¹ Read before the New York Odontological Society, February 19, 1895.

² Counsel of the Dental Society of the State of New York.

that forced a man to pay physician, surgeon, and apothecary in the same case for services that any one of them could render except for legal prohibition.

In this State of New York the physicians early organized societies and easily controlled the practice of medicine until they undertook forcibly to crush out homœopathy by social and professional ostracism, objurgation, and such implements of persecution as the civilization of our time permits. Instead of laughing at the bizarre, metaphysical ideas of Hahnemann, the doctrines of high potencies and itch, which few of his avowed disciples now pretend to believe; instead of leaving every intelligent physician free not only to investigate the doctrine but to accept what good, if any, might be in it while throwing aside its chaff, its opponents treated the new teaching as medical heresy; and heresy is a plant that flourishes best when watered with the rain of persecution. A silly doctrine that would wither in the brightness of a laugh and die in the clear light of demonstration can sprout and bear fruit under the shadow of oppression. And the net result of the crusade against homœopathy in this State has been that, instead of recognizing as physicians only those with sufficient education to fit them for proving all medical theories and holding fast the truth as they see it, without blind subservience to what has been taught in the past, the statute law of the State of New York has recognized for years an absurd division of medical men into physicians, homœopathic physicians, and eclectic physicians; and we have the stars to thank that Thompsonians, who did once get a slight footing in the statute book, vitopaths, hydropaths, and all sorts of other paths, voodooists, faith healers, Christian scientists, and the whole quack-ing flock, have not been assigned separate coops in the barn-yard of our statute book.

In 1844 sympathy for the homœopaths effected such a modification of the medical laws that for years thereafter the unlicensed practitioner of medicine was guilty of misdemeanor only in case of gross malpractice. In other words, just as it is said in law that every dog is entitled to one bite before he can be adjudged dangerous, so, under this statute, every unlicensed practitioner was entitled to kill or maim somebody before he could be considered a misdemeanant.

Not only did physicians attempt to control theories of medicine by treating heretics as quacks amenable to legal punishment, but their societies also undertook to establish fee bills, in trades-union fashion, and to treat the acceptance of less than the tariff fee as

unprofessional conduct. When, however, the Medical Society of Erie tried to expel a certain Dr. Gray for treating the county poor at less than prescribed rates, the Supreme Court decided that the corporation had transcended its powers by enacting regulations contrary to public policy.

The constitutionality of laws prohibiting the practice of medicine to persons not qualified under the statute has been affirmed by the courts of almost every State of our Union, and it has been held that the right to practise medicine is not property in such a sense that it is taken away without due process of law by regulative statutes, providing that they are general in their application and do not favor one individual more than another. The controlling decision on this point is that of the Supreme Court of the United States in the case of *Dent vs. State of West Virginia* (129 U.S., 114). And it is now established that a legislature has power to make at any time a uniform law with which every practitioner of medicine, no matter what his standing or how long he may have been in practice, must comply before he can continue to follow his profession. Such a statute was our own Medical Registration Law of 1880; and although its requirement that all practitioners should register was no hardship, nevertheless there were physicians of good standing who, feeling aggrieved that after years of practice in the community they should be compelled to register with the county clerk as a condition of continuing their business, flatly refused to obey the law until persuaded to do so by the issuance from the police courts of warrants for their arrest.

Up to this point I have spoken of medical laws, partly because they have set the pace, partly because I treat dentistry as a specialty of medicine; and the same reasoning upon which medical laws are held to be constitutional applies equally to those regulating dental practice. The desirability and efficacy of a law are, however, quite apart from its constitutionality. Many laws are constitutional that are not desirable; some, which are constitutional and would be desirable if efficacious, are so repugnant to common habits and feelings as to be almost entirely unenforceible. Whether legislation such as we are discussing is desirable depends upon the point of view. It is certainly desired by some as a means of limiting competition and enhancing the fees of individuals. *If that were its sole purpose I should be the first to urge that the statute book be purged of it.* If the sole fruit of such laws were the conviction and punishment of a few score of miserable offenders, I should say that money could not be worse spent than in enforcing them. The only justification of legislation

that restricts man's liberty to earn his bread is that it is needed to protect the public. How do medical and dental laws operate to achieve this end? I think in a twofold fashion. First, by requiring that licentiates shall have pursued an adequate course of study, they, in a large measure, protect the citizen against the ignorant quack, although powerless, more is the pity, to protect him against a quack of education. Second, such laws are school-masters with three classes of pupils. They teach the public that the care of the body should not be, certainly need not be, intrusted to persons with no knowledge of its functions or the means of relieving its disorders, and by the registration system they afford a simple way of ascertaining whether a practitioner has conformed to the requirements of the law. Again, they teach the unlicensed practitioner that he must walk warily. Lastly, they teach the licentiate himself that knowledge is the foundation of his career; and rightly understood and applied, they cultivate in him the professional motive which, even if self-seeking, as all human motives are in some degree, is, nevertheless, higher than that embodied in the trade maxim, *careat emptor*. In theory, then, the law is justified to the public at large because it protects the citizen, while to the professional man it has the added but incidental merit of being an aid in maintaining the honorable standard of his calling.

As to the efficacy of such legislation for these purposes, you are each and all qualified as well as, or better than, I to speak. I can but tell of the record of convictions: you from your daily contact with your colleagues, your students, and your patients, know what effect the law has in preventing the ignorant from entering your ranks and the public from suffering at their hands. The mere existence of a law on the statute book is of little avail to effect its purpose: "'tis the eye of childhood that fears a painted devil." In order that it may be feared a law must be enforced, firmly and surely, but also equably and in a broad spirit, lest injustice masquerade in the ermine of the law. And here is the rub. How is this to be done? If the enforcement of these laws were left to the ordinary machinery of justice,—the police magistrates, grand juries, and district attorneys,—a conviction of an illegal practitioner of medicine or dentistry would be as "rare as a day in June." This is no reflection on the officers of the law. On the contrary,—and it gives me very great pleasure to say this at this moment,—all law officers in this county with whom I have had to deal have done their full duty under these statutes. But they have enough to do in detecting and punishing the offences that are criminal *per se*, the

great crimes against God, nature, and civilization, murder, robbery, arson, swindling, and assault, crimes which the injured hasten to report and avenge. And it is not possible under existing conditions for these officers, at least not in great cities, to detect the numberless mere statutory offences, so hidden away in dark corners of the law that none of us know all of them and all of us may be guilty of some of them. Probably there is not a father here to-night who knows that if his tender-hearted boy or girl should find an English sparrow at the window on these frosty mornings and give the bird a crumb, the child, if of age of discretion, would be guilty of a misdemeanor under Chapter 641 of the laws of 1887. Fortunately, the enthusiasts who put that law on the statute book did not organize a "Society for the Prevention of Kindness to Sparrows," employing zealous agents and trained sparrows to secure evidence; and our children may, therefore, notwithstanding this law, follow, in comparative safety, their humane instincts and commit the misdemeanor of giving food and shelter to the *passer domesticus* without much likelihood of interference from the police. All our sanitary laws, laws for the protection of children and animals, and generally all laws prohibiting acts to the punishment of which their victims are not spurred on by revengeful motives, must either be enforced by private organizations or else, falling into common oblivion, become hidden traps for the unwary.

The road of a prosecuting witness is thorny; he must go before police magistrates and grand and petit juries until, except in the graver crimes, he is fain to let the offender go unwhipped rather than sacrifice more of his time and comfort. When it comes to enforcing medical and dental laws there are other difficulties than the ordinary reluctance of a witness to appear in court against the offender. Often the patient is friendly or sympathetic and therefore loath to testify, or he is chiefly bent on getting back money paid for possibly adequate services, and the chances are that if not actually bought off, his testimony will be unsatisfactory. It becomes necessary, therefore, to employ agents. And here we are confronted with two dangers: First, the danger of blackmailing; for the agent has it in his power to report an offender or not to do so; and this opportunity for oppression is, to my mind, the greatest danger and evil of all statutes enforced in this fashion. Secondly, the danger that, with an honest agent, the zeal of his work will so consume him that, in order to make a record, he will entice men into committing the very crime for which he will demand their punishment. To prevent such evil doings is the best service that

counsel to such societies can render. Nothing could be more foolish than to suppose that a long list of convictions is the best proof of a wise enforcement of the statute. It would be easy for reckless or unscrupulous men to fill the morrow's police court with technical offenders against medical and dental laws. But a few such performances would work the repeal of the statute. And so in enforcing this legislation the following rules have been laid down for agents, and, so far as I know, have been substantially followed: First, to make no false statements in order to get evidence. It is, of course, a suppression of truth if the agent goes into an office and asks to see "the doctor," without disclosing the real object of his visit. Certainly he does not voluntarily say, "Doctor, I come to get evidence against you;" but yet his instructions are that even as to this he must answer truly all questions, notwithstanding that they may lead to the disclosure of his real errand. Secondly, to persuade no one to practise who is reluctant to do so. Thirdly, to report if there is reason to believe that the suspected person is ignorant of the law; so that notice may be sent to the offender. If after the arrest the society is satisfied that clemency is properly to be exercised, the prosecution is withdrawn upon defendant's stipulation to observe the law in the future. Under these rules, during the time that I have had any connection with the enforcement of these laws, we have fortunately escaped scandal; no agent has been proved a blackmailer; no innocent person, we hope, has been punished, and the enforcement of the law has been such, we trust, as to assure the officers of justice that only public aims have been kept in view, and that prosecution has never degenerated into persecution. The chief element in the efficacy of a law is, of course, the possibility of enforcing it; and that depends largely upon local sentiment. In this city little or no difficulty has been experienced in enforcing medical and dental laws. The police magistrates and grand juries have not been influenced by personal feelings, and the press has commended the laws and their administration. But in the rural districts there has been a different experience, which two instances will illustrate.

A certain man, having fallen into bad odor in Massachusetts, came to this city and obtained a position as an assistant by falsely pretending to have been graduated from the Boston Dental College. Compelled to leave New York, he went to Herkimer. A competitor in business reported him to the State society. He was notified to obey the law, and again tried in vain to pass examinations. This he never succeeded in doing, but being a man of

plausible address he so worked upon the feeling of the neighborhood by representing himself as the victim of a rival's desire to monopolize the business of the town, that he not only managed, despite a strenuous charge of a judge of the Supreme Court, to escape indictment at the hands of three grand juries, the members of which by voting in his favor necessarily contravened their instructions and oath of office, but he even so obsessed the local editors that they took up the cudgels in his behalf, and one of them audaciously declared, in his editorial column, that although there was no doubt that the man was technically violating the law, nevertheless, no grand jury of that vicinage would ever indict him; an enunciation of rustic morals that a municipal journal, the *New York Times*, sharply scored. An even more striking instance of the willingness of grand jurors, under similar circumstances, to violate their oath of office and resolve themselves into Cadis, occurred at Warsaw in this State. Two dentists, graduates of colleges, established themselves in this town, and soon after a former resident of the place, who had been a practising wheelwright, returned from the West and also established a dental office. The strangers reported him to the grand jury; that intelligent body sent for the county clerk's register, and, finding that neither the informers nor the person informed of were registered, observed their oath by promptly indicting the strangers and violated it by dismissing the bill as to their friend and townsman. It has been said that the law is a school-master, and these instances go to show what a very large school exists in the rural districts.

Disabilities.—In this State, and the tendency throughout the country is to make the laws uniform, there are two preliminary requirements of license to practise dentistry: First, that the licensee shall have passed satisfactory examinations to be evidenced by a diploma; secondly, that he shall register his name and qualifications in the clerk's office of the county wherein he practises. The object of this second requirement is to inform the public of the practitioner's authority to practise, and to render his punishment practicable in case his pretensions are false. Not only is the unlicensed practitioner liable to punishment criminally, but he is also under civil disability. He cannot maintain an action to recover his fees. He cannot maintain an action for slander should he be called a quack, for, in legal contemplation, he is one, no matter what his professional attainment may be. Should he be called as an expert in a trial, he may be prohibited by statute, as in Wisconsin, from so testifying; and even if allowed to testify, in the absence

of a statutory prohibition his testimony would be regarded probably as of little weight. A case illustrating the point was that of *Merville vs. Merville*, tried in Herkimer on November 21, 1887. Plaintiff sued her brother-in-law for assault, alleging that he had knocked her tooth down her throat. Defendant denied the assault, and alleged that, while plaintiff herself was assaulting him and he was trying to keep her off, his finger unfortunately got into her mouth, which she promptly closed; that thereupon he naturally pulled the finger away sharply, and in so doing unwittingly extracted plaintiff's tooth with no other license than the right of self-defence. An important question then upon the trial, two years after the alleged assault, was this: Did defendant knock in or pull out plaintiff's tooth? Each side called an expert to maintain its contention. Defendant's expert, who had only studied in an office, testified that after two years it was impossible to tell from the appearance of the gum which theory of the assault was correct. On the other side, the man from Massachusetts previously mentioned testified favorably to the prosecution's theory; and qualified by swearing falsely that he had been graduated from the Boston Dental College. An examination of the dental register of Herkimer would have shown that neither expert was, at the time, registered, and cross-examination would have disclosed probably the falsity of the latter's statement in qualifying as an expert.

What constitutes the practice of dentistry must be in every case a question of fact for the jury. The word practice implies an habitual, customary course of action. But ordinarily, proof of a single extraction or treatment of a tooth, with the acceptance of a fee, has been held sufficient proof of practice; and even if the fee be not actually paid, it will suffice if the intent to receive it is clear. The exhibition of a sign, such as a golden tooth, a set of false teeth, or other indication that dental assistance can be had within, the giving of cards, and advertisements in newspapers, all go to establish the intent; and, under the North Carolina act, it was held sufficient proof of medical practice to show that the defendant held himself out as a physician and solicited patients. Under our statute, laboratory work, that part of dental work which is mechanical and no more, and is exercised upon inert matter only, does not constitute practice of dentistry, nor does assistance rendered to an operator by a student in his office for purposes of clinical instruction. Nor is it common sense to suppose that aid rendered by a layman to a licentiate in medicine or dentistry, or even in the absence of a licentiate, in case of emergency, should be considered

practice within the meaning of the statute. Treatment of diseases of the mouth by a licensed physician or surgeon is declared by our statute not to be prohibited dental practice. But it is a question whether any of these exemptions are wise. They were not put in the law because regarded as necessary, but as mere tubs to the whales, who fancying them of importance could have defeated the law except for their presence in it. Their effect is chiefly harmful, in that they encourage unscrupulous men to believe that by hanging out the sign of "mechanical dentist," or by calling their unlicensed assistants "students," they may evade the provisions of the law. The question has arisen often,—

Is Dentistry a Profession?—To me it seems clear that it is not a separate profession, but a department of medicine, connoting by medicine both physic and surgery. But I am well aware that the contrary position has been taken both by dentists and laymen. That a dentist is a tradesman, an artisan, a medical man, are all propositions that have been argued in the courts. In the English case of *Lee vs. Griffin* (30 L. J. Q. B., 252), it was held that a contract to make a set of artificial teeth to fit the patient's mouth was a contract for the sale of a chattel required to be in writing under the statute of Frauds, and would not sustain an action for labor and materials. So in that case the dentist, whose patient died before the teeth were fitted, lost his action against her executors: and worst of all, Crompton, J., remarked in the case, "There can hardly be said to be more skill in fitting teeth than in fitting a pair of breeches." In Mississippi the court held, in 1856, in the case of *Whitcomb vs. Reid* (31 Miss., 567), that dental instruments were not embraced in the exemption of mechanical tools from levy under attachment, for the reason that dentistry is not a trade or handicraft, but a profession requiring "knowledge of the physiology of the teeth." In 1868, Chief Justice Cooley held, in the case of *Maxon vs. Perrott* (17 Mich., 332), that such instruments were exempt from levy not because a dentist is a mechanic, but because the calling is of a duplex nature and is mechanical so far as tools are concerned. The court said, "Indeed, dentistry was formerly purely mechanical, and instruction in it scarcely went beyond manual dexterity in the use of tools; and a knowledge of the human system generally, and of the diseases which might effect the teeth and render an operation important, was by no means considered necessary. Of late, however, as the physiology of the human system has become better understood and the relations of the various parts and their mutual dependence become more clearly

recognized, dentistry has made great progress as a science, and its practitioners claim, with much justice, to be classed among the learned professions." Very recently, in a Missouri case (*State ex rel. Flickinger vs. Fisher*, 21 S. W., 446-593, 24 S. W., 167), the question arose before the Supreme Court of that State whether a practitioner of dentistry could, under the statute, claim exemption as a medical practitioner from jury service. Four judges constitute the first and three the second division of that court. The question came before the first division—one member being absent—in February, 1893, and they unanimously held the dentist to be a medical man; quoting in part an address of Dr. M. I. Davis, President of the American Medical Association, the court said, "While dentistry as an independent calling may have had a humble and comparatively recent origin, it has now become a very important branch of medical science. The fact that this branch of the medical profession has grown to such proportions as to have its own independent colleges and to confer its own degrees, and that it has become necessary that its practice should be regulated by statute, indicates the importance of the exercise of its functions to the public welfare. The fact that it is regulated in a separate article, and as an independent calling from that of M.D., does not in any manner affect the character of those functions." In December, 1893, the case again came up, and this time before the full bench, and a contrary opinion was given by four judges,—a majority,—the other three dissenting and adhering to their former opinion. In the course of the prevailing opinion it was said, somewhat flippantly for a judicial opinion, "Relator evidently feels unsteady on his logical legs if his sole reliance is to be on the statutory exemption heretofore noted, and so he resorts to the lexicographers and quotes from the *Century Dictionary*, where 'dentist' is thus defined: 'One whose profession it is to clean and extract teeth, repair them when diseased, and replace them, when necessary, by artificial ones; one who practices dental surgery or mechanical dentistry; a dental surgeon.' If he had delved more deeply into the science of definitions and had turned another page of the same work, he would have found 'Chiropodist: one who treats diseases or malformation of the hands or feet; especially a surgeon for the feet, hands, and nails; a cutter or extractor of corns and callosities; a corn-doctor.' So that if relator is exempt from jury duty because, as he says, he treats professionally diseases of the oral cavity, so also is his less pretentious professional brother, who with equal scientific skill treats diseases or malformations of the hands or feet and who is content to be dubbed

corn-doctor." In Great Britain the Dental Act of 1878 (41 & 42 Viet., Ch. 33), places the practice of dentistry, like that of medicine, under the supervision of the General Council of Medical Education and Registration. The new French law confines the practice of dentistry to doctors of medicine or surgeon-dentists holding the government diploma. Why there should be any disposition on the part of dentists to separate themselves from other medical men and form a separate profession I fail to see; and in an article appearing in the *Medical Record* of December 4, 1886, entitled "Is Dentistry a Specialty of Medicine?" written before I had the honor to be retained by your State Society, I endeavored to point out what seemed to me to be the fallacy of an article in the same journal, on the 20th of the previous November, written by a former president of that Society, entitled "Dentistry not a Specialty of Medicine." The whole tendency of the day, and it is not in all respects a good one, is to medical specialization. Formerly we heard of physicians or surgeons; now we hear of gynecologists, orthopedists, dermatologists, otologists, pretty much every sort of an ologist, including the stomatologist. And why should the last of them all, who, in so far as he is not an artisan or manufacturer, is very clearly a specialist in the study and treatment of maladies manifesting themselves in the human mouth, be otherwise than proud to be classed in the great body of medical men? Why should he not take the broad view of Celsus, that all branches of medicine are so interwoven that they cannot be separated, rather than the narrow view, begotten, I sometimes think, of injudicious vanity, that he should leave the society of his brethren and sit by himself in a corner? That the dentist's scientific work is medical work is recognized when we are compelled, in drafting and enforcing the dental law, to provide that the physician shall not be regarded, when doing oral work, as entering upon the forbidden field of dental practice. I have known physicians who antagonized the dental act for fear that it might be applied by narrow souls to prevent them from treating diseases of the mouth or to forbid a physician in rural districts from extracting a tooth; and I fear that there are some men with dental licenses who would be willing to see the law enforced in that spirit. But, fortunately, the standard of a profession is set by its leaders and not by its hangers-on, and the drift of dental legislation is towards educating first a physician, and then allowing him to specialize himself as a dentist. This, as it seems to me, is what should happen. First should come the broad foundation of a medical education; thereafter let the specialization follow upon that

solid basis. I speak as a layman and, perhaps, impractically. But this much does seem certain to me, that if a dentist is to be permitted to treat disease as it is manifested in the human mouth, medical education should be required of him. If, on the contrary, his is to be a totally separate calling, he must not complain if he is grouped with craftsmen. This State has gone mad on providing for examinations and licenses for all sorts of callings. First the physicians, then the dentists, then the pharmacists, then the veterinaries, then the plumbers, and now in this year of grace the Senate has passed a bill incorporating chiropodists into the *Pedic Society*, with all the privileges of medical and dental societies, and another bill is introduced regulating the practice of horseshoeing, and it is proposed also to license accountants. Where is this sort of thing to stop; and is it not worth while for men whose common duties lie in treating bodily infirmities to come under common regulations? Let me apply one test to show wherein the trade and the profession differ, and then ask with which you will be grouped. The relation of tradesman and customer ends with the sale. That of artisan and employer with the job. Not so the relation of professional man and client. A priest, a lawyer, or a physician who, at any time, should disclose his knowledge gained in the confidential relation with the penitent, client, or patient, would be rankly dishonorable and tabooed among his fellows, but the merchant may discuss his sales, the plumber his pipes, and Trilby's foot is for all the world to see.

The contractual relation between dentist and patient, assuming that the dentist is a medical specialist, is the same as that which prevails between other medical men and their patients. Formerly the compensation of physicians and lawyers was in the nature of voluntary payment by the patient or client, known as the *honorarium*. There was no right of action to collect fees for their services. Apothecaries and surgeons might sue for fees, being regarded rather as tradesmen than professional men. The barrister, to-day in England, cannot sue for his fees; but since the passage of the Medical Act a physician may do so, providing he does not belong to a society of which the by-laws prohibit members from bringing such an action. In this country, however, the physician has always been regarded as entitled to recover the value of his services in an action at common law, and so as a rule has the dentist, although, as we have seen, it was once decided in an English case that a dentist who made a set of artificial teeth was not entitled to bring an action for his services, but only for the value of

the goods sold and delivered. But that case would scarcely be followed in our courts as I think. Of course it is competent for a medical man as for any other person to enter into a special contract with his patients, even a contract of the "no cure, no pay" variety, which, however, is not favored in the law. In the absence of such a special agreement the contract on the part of the physician or surgeon and dentists is not to guarantee or insure a successful treatment of the case, but only, first, that he possess the reasonable degree of skill and learning ordinarily possessed by members of his profession qualified to practise in similar localities,—for the same degree of learning and skill is not required of a practitioner in a sparsely settled community that is demanded of one in large cities with clinical opportunities and access to libraries; secondly, that he will use reasonable and ordinary care and diligence in exercising his skill and applying his knowledge; and, thirdly, that he also use his best judgment. These rules are equally applicable to dentists as to other medical men; although it is conceivable that just as the courts hold physicians of different schools to responsibility according to the tenets of the so-called schools, in like manner they might, in the present nebulous condition of the judicial mind as to a dentist's classification, require of him a less degree of skill and knowledge in treating diseased conditions of the mouth and a higher degree of mechanical skill. Suppose, for example, that a dentist was sued for damages for malpractice in filling a tooth. It is obvious that the question may be twofold. First, whether the tooth should have been filled at all: whether as a matter of medical opinion its presence in the mouth was not a cause of nervous disturbances affecting the general health of the patient; and, secondly, whether the mechanical work of filling the cavity was properly performed. And in such a case, as I say, it might prove that one court, regarding the dentist as a medical man, might hold him to a higher degree of physiological knowledge, while another, regarding him as an artisan, might only require a proper degree of mechanical skill. But in the purely mechanical parts of the profession the same rules apply in construing the contract as are applicable in any action requiring manual or artistic skill, whether it be the painting of a portrait or the making of a suit of clothes. It is evident that the rules governing the liability for malpractice grow out of this rule regulating the contractual relation; for malpractice is nothing except failure, on the dentist's part, to perform his part of the contract, and he is, therefore, only guilty of malpractice when he treats a patient

either without the average skill and learning required of his profession under like circumstances; or if possessed of such skill and learning, when he fails to exercise them with diligence and care; or when, exercising skill and learning with diligence, he fails to make proper exercise of his judgment. Where there is reasonable ground for error in judgment, as there must always be in doubtful cases, a mistake does not, of itself, constitute malpractice. The error must be so grave as to indicate that the defendant either lacked judgment sufficient to justify him in undertaking the case or that he acted rashly without due deliberation and thought. In a New York case (*Keily vs. Colton*, 1 City Ct., 439), it was said that a dentist owes the highest degree of skill and care to a patient under an anæsthetic; and that the fact that an operator suffers a tooth to slip down the throat of the unconscious patient is *prima facie* proof of negligence. Frequently anæsthetics operate in unforeseen ways owing to the personal idiosyncrasy of the patient, and it was held in Pennsylvania (*Bogle vs. Winslow*, 5 Phila., 136) that a dentist was only bound to look to the natural and probable effects of the anæsthetic. But it certainly does not seem a hard rule to require of a dentist administering anæsthetics the same degree of skill and knowledge required of a physician or surgeon under like circumstances; and this substantially was the view taken in the case last mentioned. If the dentist employ an inefficient assistant or let his student operate upon patients, he will be liable for their malpractice. Nor will the fact that the service was gratuitously rendered excuse negligence. If by his own fault the operator extract the wrong tooth, he is of course liable; but not so if the patient points out the wrong tooth, unless, perhaps, the condition of the teeth be such as to make the patient's mistake apparent. The patient's contractual obligation is to pay for the service rendered. And in a Vermont case (*Gilman vs. Andrus*, 28 Vt., 241), it was held that false teeth were necessities to a married woman for which her husband would be compelled to pay.

The partnership relation is regulated by the same rules that obtain in any business, and is within the law merchant (*Allen vs. Blanchard*, 9 Cow., 631). A partner is liable only for acts of another if done within the scope of the mutual authority; as if he gives notes for supplies, etc. It is to be noted that a physician has been and a dentist may be held liable for the negligence of a partner; and this on the theory that each partner guarantees to the public that the one in charge brings to the business the requisite care, skill, and knowledge (*Hyrne vs. Erwin*, 23 S. C., 226; Whit-

taker *vs.* Collins, 34 Minn., 299). The imitation of another's sign is also regulated by the mercantile law (*Colton vs. Thomas*, 2 Brews., 308).

The sanctity of the person is protected by the law, and its violation punished. No liberty is excusable, however slight, not necessitated by the operation. The opportunities for improprieties are great when a patient is alone under anaesthetics; and, on the other hand, the possibilities of a blackmailing charge are equally great. In a Western State a physician called to a case of childbirth, who took a layman to carry his lantern and permitted him to come into the patient's room, the only one in the house, was mulct in damages (*DeMay vs. Roberts*, 46 Mich., 160). And a patient may not be made the subject of clinical demonstration against his will.

Expert Testimony.—The practice of calling experts in trials growing out of the common law right to call as a witness one specially skilled in an art or science has grown to such an extent that expert testimony is treated in separate volumes of the law libraries. It is possible here only to glance at one or two salient principles. It is a common fault of human nature that we espouse over zealously the cause in which we are interested. A witness is sworn to tell the truth, the whole truth, and nothing but the truth. Some witnesses try to obey their oath in all respects, so far as the court and the attorneys will permit them to do so. Many violate their oath in all respects. The honest expert tries to tell the truth and nothing but the truth in answering questions put to him. He is not always so desirous of telling the whole truth; so that it has come about of late years, especially in cases involving medical testimony, that expert witnesses are regarded in the light of special medical counsel, and many plans have been suggested for the modification of our system. At present the expert is generally examined upon a hypothetical question, framed either by himself or the counsel who calls him, and of course intended to bring out the facts favorable to his contention. He is cross-examined upon another hypothetical question framed by the counsel or expert on the other side; and too often intended to trip or muddle him. Occasionally he is bowled out of court in a few minutes by a clever cross-examiner, with questions having no bearing upon his scientific opinion. A notable instance of this was the confusion of a leading expert from another city who came here to testify in a famous case as to the diagnosis of morphine-poisoning, who narrated his experience humorously on his return home.

The cross-examination amounted to little more than this:

Q. When was your last case of morphine-poisoning?

A. About eight years ago.

Q. Were you certain it was morphine-poisoning?

A. The autopsy proved it.

Q. Do you always confirm your diagnosis by an autopsy?

A. No.

Q. When was your last case before that?

A. About fifteen years ago.

Q. And the case before that?

A. About twenty years ago.

Q. And do you, having had only three cases in twenty-five years and having needed an autopsy to confirm the diagnosis in one of them, mean to set your opinion up against that of men who have seen hundreds of cases in the same time?

By this clever stroke the force of the direct examination was destroyed in the minds of the jury; and a very modest and able man made to appear for the moment a very pretentious and ordinary person.

To remedy the evils of our present system and aid in the ascertainment of truth it has been suggested among other plans that there should be a trained body of experts appointed by the State who should inform the court in the premises. This, however, would be unsatisfactory under present conditions, since either party would still be entitled to call his own expert and to cross-examine the State's experts. Perhaps the best plan that has been suggested is that the experts on either side should examine the patient together and confer as to the results of their examination. This among fair-minded men of equal intelligence and skill ought to achieve in a majority of cases a substantial agreement, or at all events define clearly the scientific issues to be litigated. It is a generally accepted rule now that even in criminal cases expert testimony cannot be adduced merely by subpoena. A man may be compelled to tell in court what he actually knows of an occurrence, but not to put his scientific knowledge at the service of the parties without compensation. And perhaps it is out of this fact that much of the objection to expert testimony has grown, since the witness, especially if a man of weak moral nature, is necessarily biassed by his fee; particularly if it is contingent on the success of the party calling him. But when all this is said, the fact remains that truth is truth; and an honest man whose manner is not that of a partisan will generally be able to testify according to his knowledge whether we lawyers try to prevent him or not.

THEORY AND RESULTS.¹

BY G. LENOX CURTIS, M.D., D.D.S., NEW YORK CITY.

THEORIES in surgery, as in finance or government, when founded on insufficient data,—that is, on an inaccurate knowledge of the underlying principles and of the “state of the art,”—are apt to be exploded when an attempt is made to demonstrate their real worth by the practical test. For it is undeniable that results are the true criteria of the value of work. A theory which will not at all times bear this test falls.

While general surgery and many of its special branches have been brought to a high degree of perfection, where theory and result accord beautifully, there are departments of the great work of no less importance than the fields now cultivated by the medical profession which are utterly neglected in the teachings of the medical institutions and in the practice of medical men. The physician considers it beneath his dignity to investigate the mouth as an indicator or cause of disease further than to look at the tongue. He will not refer to the teeth lest he may be classed with the “dentists.” Yet the mouth, which is the gate-way to the alimentary tract, the portal through which passes the food which nourishes the body, would seem to demand his first and closest consideration.

The completeness of the lack of knowledge on the part of the average physician and surgeon concerning diseases attendant upon or following affections of the teeth, of the effects, near and remote, which such affections may cause in the organism, is appalling. Many times their patients suffer untold agony or endure prolonged illness because of the doctor's ignorance upon these subjects, which should be among the fundamentals. For much, if not all of this, the medical institutions of learning are responsible. In the curricula of many of these the teeth, for all the attention that is given to them and their diseases, let alone their anatomical and nervous relations to the remainder of the economy, might well be foreign bodies.

In view of all this, it may not be an unprofitable investment of the time to devote a half-hour to the discussion of a few reports from a plain record of facts.

Mr. A., aged twenty-eight years, who up to July 1, 1894, had

¹ Read before the Central Dental Association of Northern New Jersey.

been in good health, well nourished, and above the average in physical development, in the latter part of March experienced trouble in the eruption of the right inferior wisdom-tooth.

Examination by the dentist revealed inflammation of the gums surrounding an impacted wisdom-tooth, but not sufficiently developed to lead him to do anything for relief of patient. First and second molars in position. Dismissed with advice if trouble continued to call again. Soreness increased until May, when the gum over the tooth was lanced and painted with tincture of iodine. This was several times repeated until June 1, when an abscess formed. This also was lanced and treated in like manner until July 1, when the suffering of the patient caused the dentist to advise the extraction of the tooth, and the address of a professional extractor whose knowledge of surgery was evidently based on theory was given. Under nitrous oxide an attempt was made to extract the tooth, which resulted in the removal of the alveolar process on the lingual surface. When the patient recovered consciousness he was assured that the tooth had been fully extracted, and was shown a piece of bone of considerable size that had been taken out.

He experienced excessive pain and discomfort from the operation, and there was great soreness, due to the lacerated tissue. Complaining of this, his dentist said it was of no importance, he would be all right in a day or two, not even prescribing a disinfectant mouth-wash. Patient noticed considerable excitement on the part of the dentist and his assistant, and recalled while in a semi-conscious condition hearing the associate express surprise, which led him to believe that the operation was out of the usual run. For several days the patient was confined to his room and unable to lie down because of the severe soreness of a bruised back. His jaws became rigid and closed, necessitating the use of a fluid diet. Face was badly swollen, and pain increased hourly. On the second day following the operation pus began to flow from the mouth, and the swelling was so pronounced that he again consulted the extractor, who laid the trouble to cold and malaria, and considered the operation a perfect success.

After a week of intense suffering and extreme weakness for want of food he consulted his family physician, who was unable to relieve his suffering, and advised him to see a general surgeon, who in turn told him he was a subject for the dentist, and that he knew nothing of such diseases. Another surgeon, placing his finger along the inside of the cheek back to the upper wisdom-tooth,

which had been fractured during the extraction of the lower wisdom-tooth, said that the whole trouble was there, and again he was referred to the dentist, who ridiculed him and dismissed him as before. There was excruciating pain in the region of the right tonsil, which was relieved on opening of abscess. A physician was then called who admitted his inability to treat the case, and turned him over to a young man with a recent hospital experience, in whose hands he got his first relief.

Pus had burrowed through and formed a large cheek abscess. The patient was now very weak and debilitated, with constant discharge of pus from the mouth. An opening was made through the face, in the region of the malar bone, which was syringed daily. Under this treatment the patient improved, and the swelling subsided, leaving an opening below and back of the angle of the inferior maxillary.

Through the poison in his system the patient was in so precarious a condition that a consultation was held, and he was advised to go to New York for treatment. With his physician he presented at my office on December 7.

Examination revealed a large indurated mass just below the jaw on the right side. Very offensive pus was discharging from the opening before referred to.

The introduction of a probe revealed great destruction of tissue below the jaw and extending back to the tonsil, where a hardened substance about an inch in size was outlined. Had not the history of the extraction been so definite, I would have been led to believe that a tooth was lodged there; but we concluded it was a fragment of the alveolar process covered with fibrous tissue, which his physician had been trying to dissolve with medicine given internally.

The patient was able to get his teeth open one quarter of an inch, which allowed me to examine the wound where the tooth had been extracted. Pus was exuding freely from this wound of the same offensive character that had predominated. Passing a probe into the wound I found that the alveolar process had been fractured, and that a large opening led to the hardened mass external to the tonsil.

The patient was in constant pain, confined largely to the right side of the face, very anæmic and nervous, and health completely broken. An immediate operation was advised. Under an anæsthetic the wound where the tooth had been extracted was enlarged, rough bone due to the fracture of alveolar process and suppurating

tissue leading to the hardened mass was curetted away, allowing more complete examination for the cause of the trouble, when a steel probe readily detected enamel. I passed an instrument around and behind the tonsil, and gradually dislodged and removed a tooth, upon sight of which his physician said, "It would have taken me a long time to dissolve that with any agent known to medicine." I herewith present the third molar, in a perfectly developed condition, leaving no marks of having been caught in the jaws of the forceps.

The abscess under the jaw which involved the entire cellular tissue was thoroughly curetted away, leaving a depression about two by three inches in size with exceedingly thin skin. Packed with gauze and allowed the wound to granulate from bottom. No pus from wound near the tonsil after the operation, but some in outside wound until it was curetted out.

Patient began at once to improve on antipyæmic treatment and nourishing diet. Several days after the operation he complained of severe pain extending along the right side of the face. Examination of the third molar revealed an exposed pulp, following the extraction of which there has been no return. In three weeks the patient was dismissed, and with no deformity from the operation.

It looks reasonable to me that when the dentist attempted to extract the tooth, instead of grasping it he bore down upon the masticating surface with the points of the forceps, forcing the tooth through the alveolar process, which was fractured, and crowded the tooth down behind the tonsil, where it was found embedded. I am told by the patient that since the extractor learned of the removal of the tooth, he stated that he thought the patient had swallowed it and did not dare to acknowledge the facts, preferring to cover up the wrong-doing by saying he had extracted the tooth, and it had been lost among others in the cuspidor.

Mr. B., aged fifty-five years. Patient for some time suffering from neuralgia which a dentist thought due to abscess of the inferior left central incisor and inferior left molar, which are pulpless. These teeth had been under treatment for some time, but resisted all efforts to cure disease. On examination the upper arch was found edentulous, the patient wearing an artificial denture. Examination of diseased inferior incisor revealed a canal thoroughly opened. Fistula opening through the gum near end of root, through which a probe showed extensive absorption of bone. The left lateral and cuspid teeth were found to contain decomposed pulps, and a probe could be passed from the fistula back to the bicuspid

below the ends of the roots. The molars were also abscessed, with a fistulous opening through the gum on the lingual surface. The posterior canal was opened through the apex, and the anterior buccal canal was partially entered and plugged with bamboo. Inferior wisdom-tooth lost. On November 27 the central incisor canals were cleansed, sterilized, and filled to the apex with chloro-percha.

The canal in the lateral incisor was opened freely and drilled nearly to the apex, but was unable to get nearer than a fraction over one-sixteenth of an inch from the apex. Sterilized and filled with chloro-percha. Patient was referred to dentist for removal of gold crown from cuspid, and to report on Saturday. On that day examination revealed the removal of crown; the canal of the cuspid had been opened into and dressed with creosote.

On December 1 canal of cuspid was more fully opened, and a probe passed beyond the apex. Canals sterilized and filled with chloro-percha, some of which oozed out through the apical foramen. Cocaine was injected into the gum, and alveotomy performed. Chloro-percha oozed out through the wound. Cavity in alveolar process around cuspid and incisors burned and curetted away. Debris washed out and wound sterilized December 3. The gums over the cuspid found considerably swollen. Wound opened with probe, and tincture of iodine injected. December 5, gums found less swollen and inflamed. External application of iodine. Anterior buccal canal of molar opened to apex; also posterior canal more freely opened to apex. Search for lingual canals resulted more favorably after drilling considerable dentine away in the floor of the pulp-chamber. Canals found to be small and almost closed by deposit of secondary dentine, but larger upon opening into them. Both were opened to the apex so that a delicate probe passed beyond. All four canals were flooded with carbolic acid; ropes of cotton were packed in and sealed for the purpose of disinfection. Two hours' time was occupied in opening these canals. The following day the canals were packed with iodoform. No unusual disturbance around tooth.

December 7, all signs of inflammation had subsided, and the teeth were entirely comfortable. The canals were dried and filled with chloro-percha, which was forced through the apical foramen of the distal canals, and oozed through the fistula in the gum. The floor of the pulp-chamber was carefully lined with gutta-percha, and the cavity filled with cotton. Case referred to dentist for filling. Under cocaine a bur was passed through the fistula, abscess

and *debris* burred and curetted away; wound washed out with electrozone. Wound dressed daily for several days with disinfectant and tincture of iodine. Patient complained all the time of severe neuralgic pain in left side of face, more especially when tired or at night.

Dentist's attention directed to second left inferior molar, which was very sensitive owing to abrasion in mastication and having been ground down so as to make the teeth on plate above occlude properly. Advised to look for irritation of pulp. This advice not considered good to the extent of investigation.

December 19, after an exceedingly restless and painful night, patient consulted family physician, who bitterly censured the advice and operations of the dentist and of myself, and demanded that he immediately go to a professional extractor and have the teeth drawn, leaving the posterior molar untouched. It was no easy task for me to dissuade the patient from acting on the physician's advice. Again repeated the necessity of care of back molar; also opened through the gum and curetted around the anterior buccal root of the first molar with a view to bloodletting and to relieve light congestion around tooth, and also in the pulp of back molar. The pain continued, and the dentist saw the wisdom of opening into the second molar, which revealed four pulp-stones about the size of a pin's head as the cause of the trouble, on the removal of which, along with the entire pulp, all pain disappeared, and the patient was rendered comfortable.

History.—December 18.—Mr. D., aged thirty-four. For ten years or more patient had dull pain in upper right half of face, sometimes extending to side of head, with soreness on upper jaw below malar bone. About seven years ago he had the first superior molar extracted, since when he particularly noticed an opening through the gum in the neighborhood of the affected tooth, through which pus discharged. All these years he at times had very heavy dull feeling in the right side of the face, in the nose, and under the eye, which would leave the eyeballs sore and tender. A pain sometimes ran down the right arm and side of the chest, resembling that of rheumatism. For one year he has had continual sharp pain in the left side of the face and in the eye, which on any quick movement of head or an attempt to read rendered him dizzy so he would stagger. When apparently free from pain a quick turn of the head would cause it to reappear. Neither physician nor dentist could point out the cause of the trouble, but advised the extraction of the second bicuspid on the affected side, and an at-

tempt to do so resulted in the fracture of the roots, when, in order to get the pieces, nearly the entire alveolar process was cut away. The wound was a long time in healing, and neuralgic pains continued just the same. He was advised to consult a well-known specialist, who heard his history, examined the case, and from a placebo which was given him I inferred, as did the patient, that the surgeon took his case to be one of hypochondriasis.

Two days later he presented at my office with the history given above. Examination of the right side revealed a fistulous opening posterior to the second bicuspid, which would be exceedingly difficult for inexperienced eyes to detect, as there was no inflammation or hypertrophy surrounding it. A probe was readily passed through it and into the antrum. The removal of the probe was followed by a straw-colored fluid, leading me to the belief that bone-disease existed. I found that all the alveolar processes anterior to the second molar roots and first bicuspid, save sufficient to hold that tooth in position, had been destroyed. The destruction extending to the lower border of the malar bone and floor of antrum. Within that area it was completely gone. The hard palate opposite to the extracted tooth was necrosed for half an inch and a sequestrum about one-quarter of an inch in width, held and supported by a narrow neck, was forming at the line of demarcation. The second bicuspid contained a putrescent pulp, which when opened was exceedingly offensive. I concluded cause sufficient for disturbance on the right side of the face had been detected. The symptoms on the left side were then looked into. The left half of the upper lip was swollen and inflamed, especially so at night, bothering him in talking and eating. A notable condition in the expression of that half of the face was the want of normal fulness, showing a long-continued irritation of the nerves which supplied the muscles, which had resulted in their being atrophied, save those of the upper lip; even a change in the size and expression of the eye was visible. During the examination he had many paroxysms of pain. The first and second molars of the lower jaw contained large amalgam fillings, from the size of which I was led to infer that the teeth were pulpless. The wisdom-tooth had been extracted. No hypertrophy or inflammation of gums indicated periodontal inflammation. The teeth in upper jaw had a normal appearance. The wisdom-tooth was elongated from lack of occlusion, and the gum around the same was slightly inflamed. Percussion of the teeth normal, save in the first molar, which was very faintly heard. No soreness of teeth, but a change in the expression of the eye led

to the belief of pulp-stone occupying that tooth. There was also faint discoloration. The mesial buccal root was slightly denuded of gum tissue, due to extraction of the bicuspid and treatment of the gum. The cementum of the denuded root was not sensitive to any of the usual tests made, and I decided to open through the side of this root with a small drill to ascertain its vitality. The canal was entered with no visible signs of a pulp. No odor present to indicate that it was dead. Passed a flexible bristle to the apex of the root without resistance. A drop of blood was drawn from beyond the apex. A large opening was then drilled through the masticating surface of the tooth, and the pulp cavity was fully exposed and found to contain three large pulp-stones. The one I present with the case covered the canal of the palatal root, and upon its removal the entire pulp of that root came away attached and completely ossified except a sixty-fourth of an inch at the apex. Its removal was followed by a gush of blood.

The cure was like magic. The patient's general expression changed instantly as if he had been freed from captivity, and he exclaimed, "Why, what have you done? The pain has gone, I can turn my head quickly without causing pain." Believing this statement to be true, and to immediately make further test I said, "Perhaps it is only mental relief," upon which he remarked, "Mental or not, there certainly is a change, and I am free from pain;" and this condition has proved to be lasting as well as true. All three canals were opened to the apex, and on account of hemorrhage were antiseptically dressed and left until the following day, when they were flowed full of beeswax and left for the dentist to finish. The patient reported having had the first night of uninterrupted sleep in over a year, with no pain. He also had been able to read without vertigo, and he very much enjoyed the ability to move his head quickly without anticipation of suffering. Not finding indications of pulp-stone in the wisdom-tooth, and it being of no practical value to the patient, I extracted it with a view to examining the pulp and thus prove tests of diagnosing pulp-stones, and was gratified on opening the tooth to find a normal pulp. Thorough cleansing, sterilizing, and filling of the canals of the bicuspid in the right side followed. Examination of the antrum did not reveal a purulent condition, only an apparent chronic inflammation. The discharge of pus was from the necrosis of the palatal plate. The operation consisted of burring away the sequestrum, abscess sac, and granulating tissue, curetting and removing same, and douching both the alveolar cavity and antrum with peroxide and bi-

chloride solutions, and repeating the bichloride twice daily for forty-eight hours. At this time the patient found it necessary to return to his home. He was carefully instructed that should antrum symptoms develop he should return immediately for regular treatment for this disease. Ten days later the report from the patient was very favorable, no inconvenience whatever having been experienced.

Another typical case bearing on the subject in hand is reported to me by my friend, Dr. Ives, 63 West Thirty-fifth Street.

A lad, twelve years of age, was brought to him November 12 for dental operation. Examination of the mouth showed an overcrowded arch resulting in irregularity of the teeth, which were very poorly calcified, and contained many sensitive cavities. In the inferior first molars were extensive amalgam fillings and several disintegrating spots. The pulps of the superior first molars were dead, and in reply to an inquiry as to why the lad wore glasses, his mother said, "By order of Dr. —, under whose care he has been for a long while for treatment of St. Vitus's dance of the eyes." The boy's eyes, lids, and brows were rapidly and constantly twitching, to the great discomfort of himself and those about him, and he was nervous and irritable. Dr. Ives's experience enabled him to quickly see the relation between the boy's trouble and the condition of his teeth, and he directed that he be taken to Dr. Hasbrouck for the extraction of the four sixth-year molars, with the promise that the extraction would cure his "St. Vitus's dance." This was done, and at the expiration of ten days the boy returned, without glasses, and all signs of irregular movements about the eyes had disappeared. The boy was then taken to the physician, a well-known oculist of good repute, with a statement of what had been done, but he repudiated the idea that the change was owing to the extraction of the teeth,—“it was impossible,”—and claimed that the cure was entirely due to his treatment.

These cases, all of which are of recent occurrence, point the idea previously expressed of the lack of appreciation among members of the medical profession generally of the important *role* which the condition of the mouth and teeth, more especially the latter, plays in disease. They can be duplicated by the dozen, but hundreds, alas, of the sufferers from the protean effects of unsuspected dental disease never find relief because of the ignorance of their physicians. There are many cases, again, where the dentist discovers the cause of the trouble, it may be with the patient's gen-

eral health, but he is overruled by the physician, whose authority and knowledge are supposed by the patient to be supreme.

Few, perhaps, have better opportunities than I to see the evils which flow from the physician's ignorance upon the subject of the teeth. The physician, in formulating his theories for the explanation of obscure troubles, entirely ignores this factor. He has never been taught to appreciate the teeth as a possible element in any disorder except toothache, or perhaps a neuralgia of the face. The medical schools are no aid to him, the text-books give him no inkling of the truth. The teeth are the province of the dentist, and the dentist is too often looked upon with contempt by his medical *confrère* as being a one-sided, semi-educated man, when really this very one-sidedness has made him a master in oral and facial diseases. Upon these points the dentist does not vainly theorize. He gets results, and these results are his recommendations to the medical profession.

It seems to me that in this day of enlightenment upon the teeth among dentists, it is almost criminal in the medical institutions of learning to send their graduates out with the worse than half knowledge of the subject which should be given them. If this be so with regard to the colleges, what shall we say of the man who, practising the most beneficent profession in the world, fails to acquaint himself with a subject so important to the sound pursuit of medicine? Is he not lacking in his duty to himself and to his patients? With so important a factor in many cases entirely omitted, can he do more than vainly experiment upon his patients, blindly groping for what he has not eyes to see?

I have no objection to experimenting with patients, with a view to further enlightenment, provided it is done honestly and with all the possible known elements estimated at their true value. But when experiment is necessary because the physician or surgeon lacks common practical knowledge which he can easily avail himself of, I cannot uphold it. Such a course must necessarily be merely mercenary. A theory formed by such a man must be wrong, his practice cannot help being mischievous, his results, so far as good is concerned, will be *nil*. He is simply a "guesser," and while he is guessing his patient's life may be slipping away.

It behooves us, then, to endeavor by every manly means to free ourselves from every environing circumstance which tends to cramp our efforts to relieve human suffering. What we are after are results, not theory. As we can learn industry from the little busy bee or patience and perseverance from the spider, so we may even

learn the relations of the condition of teeth to apparently unrelated lesions from the dentist. Certainly we should neglect no source of information which would strengthen or enlarge our means of fighting disease. So, and so only, shall we be able to confer upon our patients the highest benefits within the limits of our profession.

Reports of Society Meetings.

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening February 19, 1895, at the New York Academy of Medicine, No. 17 West Forty-third Street, New York, with the President, Dr. Northrop, in the chair.

The minutes of the previous meeting were read by the secretary and approved.

The President.—I take great pleasure in presenting to you to-night some models of a mouth, from J. G. Briggotte, of Paris. These casts were described by Dr. Briggotte in a paper read before this Society March 9, 1886, an account of which can be found on page 365 of vol. xxviii. of the *Dental Cosmos*. They are put up in composition, and show the articulation (which is very much out of place), and what was done to provide the mouth with a perfect denture. It seems to me he has displayed a great deal of skill and discretion, and the models are worthy of thought and examination.

A motion to receive the same with thanks was carried.

Dr. John H. Meyer.—There have been many contrivances brought before the dental profession to enable the practitioner to make his own porcelain crowns, porcelain inlays, porcelain tips, bridge-work, the making of blocks, or the building up of broken teeth, which would be more generally adopted if the process of baking were better understood. I have been so frequently consulted regarding this that I have decided to offer my services to teach the art of baking porcelain to any member of this or a sister society free of charge, and will set aside each Saturday afternoon from two until four o'clock, during the months of March, April, and May for that purpose.

The paper of the evening, "The Application of some Principles

of Law to the Practice of Dentistry," was then read by Mr. W. A. Purrington, of New York, who prefaced the reading with the following remarks.

Mr. Purrington.—I find myself very much in the position of a greedy boy with a very red apple, who has bitten off a great deal more than he can comfortably chew. I gave your secretary a synopsis of this paper in an oblivious moment, not realizing altogether its scope, which is so wide that it would be absolutely impossible for me to enlarge upon the various topics without boring you to death and keeping you here a weary age. Consequently I can only give to you in detail that which seems to be of most importance, and touch upon the other subjects with what lightness I may; because, if I knew the entire law (as I do not), I should still be unable to tell it to you; and if I should tell you all the law on the subject, you would go away very little wiser than you came; so it is better for me to confine my paper to those topics which seem peculiarly interesting to your profession.

I want to say one word as to the progress of dentistry towards the professional status. We know perfectly well that the practice of medicine and surgery was formerly carried on by the priests. The healing of the body and the healing of the soul was in the same hands; but the healing of the body proved more fascinating to many than the healing of the soul, and monks and priests would absent themselves from the convents to look after the sick. They did not say so many *Aves* and they skipped many *Paters*; but they did a great deal of good. So the Council of Tours forbade that the priests should perform any operations; thus surgical operations and later the practice of physic passed into lay hands. You may see very markedly the result even to-day in the older communities; in England, for instance, where a physician has a very different standing from a surgeon or an apothecary. While physic was still practised by the clergy, surgery fell into the hands of the smith and the barber, whose pole, with a bandage, is still displayed in remembrance of the twofold trade. The English surgeon is not called doctor. He is simply mister. His social rank is less than that of physicians, some of whom have been knighted, although I do not recall any physician who has gone beyond knighthood. We know that all this is ridiculous, we see its folly, the asininity of still regarding men who devote themselves to the healing of the body somewhat from the point of view taken in a time when medical men were the constant object of ridicule. But the force of custom is powerful and persistent. In new communities it is less so.

But neither custom nor laws can say the last word in determining our lives.

We make ourselves. The chief use of any law is the school-master use. I would not give the snap of my finger for our license law if its sole effect were that visited upon the individual punished for its violation. You find him transgressing again and again. He pays his fine each time. But when he is convicted and the newspapers say that he is convicted, a large number of men fear to follow his example, and a larger number grow to consider his behavior as low and disreputable. There is the influence of the law.

The initial chapter of a recent publication, *Code du Chirurgien Dentiste*, par MM. Roger and Godon, written to show the position of the dentist under the French law, points out how analogous that position has been in the early part of this century to that of the physician in the time of Molière, when the man of drugs was a fair butt for the shafts of every wit. There was ground for this ridicule in the ignorance and pretentiousness of physicians. There was the same ground as to dentists. The advertising by stuffed crocodiles and alembics of the one, the displays of grinning teeth by the other were fair game for the wags. As physician or dentist came to be more skilful, learned, and modest, they won and received higher recognition. And in our day of diffused scientific knowledge the surgeon bids fair to outstrip the physician. If a lawyer misconducts his case in court, every lawyer there may know it. And so do the surgeon and the dentist leave their open trail for their fellows to detect, while the physician's work still continues to be largely in the field of conjecture where error is hard to trace. Some of you will remember the famous case of Professor Webster, convicted of murdering Mr. Parkman. The latter dunned the former persistently, and Webster, probably in a fit of passion and, perhaps, without criminal intent, killed him. He then, to conceal the crime, cut the body to pieces and burned it piecemeal. He was detected at the work, a tooth was found and submitted to a dentist who, recognizing his work, exclaimed "poor Parkman," and Webster's fate was sealed. It is because of the trail that the surgeon and dentist leave by mechanical operations that malpractice suits are more often brought against them than against physicians, whose faults the earth so often covers. Medical men must be differentiated in a way; but the differentiation is not to be made in the cradle. A medical student does not or should not begin his specialization in the class-room. He gets his determining bent as his knowledge grows. I am but a layman, and yet can see some

reason for the tremendous and perhaps excessive specialization of our time; but it does seem to me that the best specialization is that of a man who starts at the foundation, and is first a physician and then a specialist, as his riper knowledge or the accidents of practice may determine. The broader the basis of knowledge the greater your mental and scientific position in every way; you are of the family of medical men, and your early education should be with your fellows; that being so, whatever specialty you may follow you will still be in the fold.

I can scarcely quit this good company and this topic without suggesting that, if the enactment and enforcement of dental laws has benefited your profession and the public in this State, you owe a debt, more than many of you realize, to those of your number—to one notably—who, in a spirit of unselfish devotion, have achieved such results as we have, sparing neither time nor money, and paying liberally the debt that every man is said to owe to his profession. I have been in position to see that faithful work, and I am sure I need not mention a name to call up in your minds to whom your appreciation is so largely due.

(For Mr. Purrington's paper, see page 403.)

DISCUSSION.

Dr. Curr.—I wish to ask Mr. Purrington a question. If a patient requested that a certain tooth, which he designated, should be extracted, and, after extraction, the tooth was found to be sound, could the practitioner legally be held responsible?

Mr. Purrington.—The only answer I can make is, that it depends somewhat upon the doctrine of "contributory negligence." If your mistake were due to the patient's fault you would be excusable.

If a man came to your office with an aching tooth and said, "Doctor, extract my tooth," and you—especially if the man were under the influence of anæsthesia—should extract a sound tooth, the man might, perhaps, recover damages for your negligence; but, on the other hand, if the man wanted a tooth extracted, all the other teeth being in a similar condition, you have a right to extract whatever tooth he should point out; but such questions of fact can only be solved by the jury. You would be negligent if a man had two teeth side by side, one absolutely sound and one absolutely bad, if you should extract the sound tooth because he happened to point it out, leaving the bad one in the mouth. That would be scarcely contributory negligence on his part, I should say, for under such circumstances the patient may easily touch the wrong tooth.

Dr. Carr.—Although the student clause is clearly defined, yet many claim that the student is not amenable to the law if he operates in the office with a dentist. Will Mr. Purrington define the student clause?

Mr. Purrington.—This is asking me to pass on a statutory law. When MacCauley made his Indian code, he thought lawyers were fools to find so much difficulty in making and construing statutes. But when a case was submitted to him he admitted that he knew what it meant when he wrote the code, but did not know what it meant when the lawyers presented the two sides of the question. It seems to me that the student law is so clear that there can be no doubt about it. The student is exempted who assists his preceptor in clinical operations. That is a full exemption. There is no reason in the world why I cannot assist you if I am in your office. You are trained and capable, and I being there, and you wanting some assistance, whatever it may be,—there is no reason in common sense why I cannot help you. The most instructive and entertaining after-dinner speech I ever heard was made at a dinner of the medical alumni of the University by one who is now dead. He spoke of the happy life of a rural physician, and of an operation performed by him now very common,—then very rare. He said that he had extracted a tumor from a woman who weighed one hundred and sixty pounds when she came in, and ninety pounds when she went out, and his only assistants were the laymen he could call in to help him.

There is no reason why I cannot help any suffering person in the absence of a professional man. This statute expressly provides that your student, with you for purposes of clinical instruction, may help you; but it does not mean that you can turn your work over to your student. He may help you; he cannot act for you. You do the work; he stands by. If there were one thing wherein your profession had the advantage over the medical profession in the present system of training, I should say it were in that one particular thing that your student has opportunities for clinical instruction that do not exist in the medical profession, except for the favored few who walk to the hospitals.

The law intends that when you perform an operation, and have a student in your office, you have a right to ask him to help you; but it must be under your immediate eye. You do the work and he gives such assistance as you may require, and therein he gets his knowledge.

Dr. Crawford.—I can say with much pleasure that I am glad to

meet the essayist. I have been very much entertained this evening. If I were going to write a book on the subject of medical or dental jurisprudence, I would like to have the essay of the evening as a preface. I think it would be a good thing if this Society would request all the dental journals in this country to publish this paper. I would like to take it down to my office and post it on my walls.

I was particularly pleased with the definition the gentleman gave of what dental surgery is and where it belongs. That is the kind of doctrine that I like to endorse. Any other that has ever been given on that subject has had a tendency to impair the interest of the so-called dental profession. It is one of the most important questions that has ever been agitated in our specialty. At the time it gave me a great deal of trouble and concern, and I want, in his presence to-night, to earnestly thank the learned gentleman for the truth in reference to this matter. The moral force of everything else that has been said on that subject has had rather a tendency to injure and impair the welfare of this department of medicine. I want to say for the gentleman's encouragement that of all the departments of medicine and surgery, the dental surgeon needs a higher, a broader, and a better fundamental education than any other specialty in surgery. The results of our modern civilization have made it so that the American child needs a dental surgeon to superintend the eruption, and particularly the displacement or shedding of the first set of teeth, as he needs the doctor of divinity to baptize him, or the obstetrician to preside over the parturient chamber when he first sees the light of day. Upon that hypothesis I claim that it more nearly touches the entire human family than any other branch of surgery. I thank you for the definition of what dental surgery is, and for placing it where it belongs.

The President.—We have with us to-night Mr. John Sabine Smith, who is president of the Society of Medical Jurisprudence, and we shall all be pleased to hear from him.

Mr. John Sabine Smith.—I came here to listen and to learn. I feel that I have learned a great deal this evening. This is a new branch of jurisprudence to me, and one to which I have never given any special thought; but I think the subject has been so exhaustively treated in the paper that nothing can be added to it. Only one suggestion presents itself to me, and that is, the question whether dentistry is to be regarded as a distinct profession, or whether it is a branch of medicine. What little observation I have had on the subject has led me to think that it is a question to be

determined by the profession itself. There are no better judges of the subject where the line is to be drawn than the dentists themselves. At least, they are able to determine that question as they stand before the public,—to determine whether it is to be a profession or not. If they place it upon a high plane and keep it there, with all the dignity and propriety and seclusion which applies to medicine, law, and theology, I think we will find that it will be conceded to be fully equal to rest upon the same plane as the others, and to be entitled to all the privileges and respect which other professions receive. The illustration of that comes from the case spoken of by the essayist, which occurred in Missouri, I believe, in which three judges determined that it was a profession by itself, and when seven judges sat together, four of them reversed the decision, and declared that it was not, and that it might be classed with chiropodists and other kindred grades of skill. I am impressed with the idea that the four judges who had reversed the case had been in the habit of employing cheap advertising dentists. They had a low opinion of the profession. They regarded the dentist's instruments as tools. They classed a dentist with a jeweller, for instance. Probably they had work done cheap. Perhaps one of them had some false teeth made for a small price, and in order to do it, had had his own teeth extracted at a discount, and he made up his mind that dentistry was a good trade. He never thought of it being anything else. But on the other bench, where there were three judges, one of them had a great respect for his mouth as much as any other part of his body. He had consulted skilful dentists, and he came to regard the dentist as he did his physician. I think this question will be ultimately determined as a matter of history, so to say, as among the affairs of the world. It will ultimately be written down as a profession entitled to all the dignity and respect of the other learned professions, when it becomes universally such among dentists themselves.

Professor Abbott.—All this discussion is extremely interesting, and much of it very instructive. Still, the whole drift seems to be towards the idea that dentistry as a specialty of medicine stands on the same level, or has a right to be considered on the same level, as the older or the mother profession of general medicine. You must remember that dentistry as such is comparatively young in this country. How did practical dentistry commence? By jewellers, watch-makers, tinkers, and barbers. Even to-day some barbers are practising it. It takes time for any profession or specialty of a profession to grow. It is taught as a specialty in our colleges;

and in our teaching we go very far towards qualifying the dental student for general practice. We teach anatomy, physiology, pathology, and chemistry as thoroughly as any medical schools. All medicines used in treating diseases of the buccal cavity, whether directly or indirectly, are carefully considered. Instead of going over the ground of the general practitioner, in general practice of medicine and surgery, obstetrics and the diseases of women and children, oral and dental surgery, and dental prosthesis are taught. When our young men leave college and come to me for advice in reference to their further studies, I advise them all, if possible, to keep on until they get their degree of M.D. They have simply begun their studies, have merely education enough to practise, perhaps successfully; but they need a broad foundation, and the way to get it is to enter some good medical college and secure a degree. I see before me to-night more than one man who holds his degree of M.D. under that advice. There are some things in reference to professional education that I think should be looked into. I was very much pleased, indeed, with the definition given by the essayist in reference to the student's position. Many students have come to me with what they understood was a construction of the law in the State of New York. This construction was that they could go into an office and practise as much as they pleased, as long as the dentist himself was somewhere in the house. My only comment at such times is, "It seems to me you should work as an assistant in an office, and if you do anything more than assist your preceptor you take risks." "Never do anything where there would be a chance of prosecution for violating the law;" students do, I believe, work outside in offices "over the chair." I am satisfied that it is a very common practice with many men. In Brooklyn, Jersey City, and New York you can find many of them who spend three or four hours every day in such practice. These men are certainly violating the law of this State and of New Jersey. In New Jersey every man is required to pass a good solid examination, as severe as any college faculty would give him before he is allowed to practise in that State. It is the kind of examination that I hope to see conducted in this State. Why? Simply because we want to know who is competent to practise dentistry before he is allowed to do so. We do not want men to come here and merely because they have a diploma be allowed to go to the county clerk's office and register. Many men holding diplomas are not competent, and should never touch a patient's mouth. They should not be allowed to practise until it is

determined by a competent Board of Examiners in the State of New York that they have an educational right to do so.

Dr. Rhein.—I would like to ask the essayist a question in reference to students working in offices. If a student has the privilege in a college to clinically work over patients for which a fee of some kind is required, would a strict interpretation of the Code say that a student could not further practise gratuitously outside of the college?

Dr. Carr.—In colleges there are demonstrators who are legally qualified to practise dentistry and who go from chair to chair giving instructions to students.

Mr. Purrington.—There is no law that allows a man to do anything in a college that he cannot do outside. I think the idea that you allude to is a development. It is a very false idea, having its origin perhaps in the fact that under our medical statute there has been an exemption of men on the hospital staffs. There is nothing in the law that would allow a student inside of a college to practise gratuitously, or for a fee. If he does so, he may thank his environment that he is not caught. If he goes outside where there is not that environment, he is liable to be caught, because almost any day a person employed by the dental society might come in and catch him, and he would be punished. I would infer from your question that there must be a certain amount of violation of the dental laws going on inside of the college walls.

Dr. Rhein.—Why is it that so much stress is always laid on the point (when bringing proceedings against illegal practitioners), that they have received a fee for these services, if it makes no difference that the work has been done gratuitously or for a fee?

Mr. Purrington.—There are two reasons for it. In the first place, the statute as originally drawn, distinctly provided that the work should be for a fee or reward. The other reason is one alluded to in my paper, that practice implies a customary act. In a case that you could suppose, whether certain acts constitute practice in dentistry must, in the last resort, be a case for the jury. You might tell me of a hundred cases, and I could not really say how in those cases a jury would pass upon the facts. I may practise dentistry for a fee or reward; or I may, in a case of great emergency, finding a man suffering with toothache, assist him. The latter act, of course, does not mean that I am practising dentistry. I simply suggest to a suffering fellow something that will help him. Whether defendant has practised is the question in every case for the police, the judge, or the jury. But there is no intention on the part of

the law to allow unqualified men to practise. It is allowed that students may assist preceptors in their work, to the end that the students may get instruction therefrom. They are there to see how those things are done. I do not know enough about the detail of the college work to say exactly whether or not the law is ever violated there.

Dr. Abbott.—The answer to this question is not altogether satisfactory, for the reason that dentistry is a peculiar calling. No man can be a dentist until he handles the patient himself. No man can learn dental surgery except by actual practice. He may look at his preceptor operate for years, and still be ignorant of the way of managing the patient himself. The student who looks into the patient's mouth and sees the operation done by the practitioner will eventually get a patient, and he will work upon him. No matter if it is contrary to law, he must learn in some way or other; he can pass no examination before any college faculty or any board of examiners without that practical knowledge. How is he to obtain that knowledge if he is not allowed to practise? In our colleges that is a special department. We have one room with from seventy-five to one hundred chairs in it. Sometimes that room is filled with patients and operators,—young men who are learning practical dentistry. They are practising under the instruction of men who go from one to another and tell them how to do the work, how to avoid making mistakes, etc. If every student in our colleges is violating the law by practising over patients, it is a remarkable state of affairs, and not what, in my judgment, was intended by the framers of our laws. I hardly think a jury would convict a man who did it. We have any quantity of men in this city (and some of them I see before me now) who have been at the college and know just what is required. They learned their first practical ideas of dentistry there by working over the patients themselves. The work is always done under instructors, so that students can hardly make mistakes. Of course, the greatest care is taken in the selection of the men who instruct them. A careful study of this subject, it seems to me, will convince any man that such practical instruction is of the greatest importance from a public health stand-point.

Mr. Purrington.—It seems to me as if this is based on a hypothetical question on one side, followed by an entirely different hypothetical question on the other. If a man came into a dental college and paid fees, and were practised on, how would that be different from practice carried on outside? Dr. Abbott puts the case differently, and says a person is practised on under the eye of

the instructor. The fundamental point that Dr. Abbott raises is so true that I do not see how we will ever get away from it. I have always felt uncomfortable at the thought that all medical students have to get their experience at the expense of persons who would recover in spite of them, or would die in spite of their best efforts. It is said that a man cannot practise medicine unless he has certain qualifications. All the law in the world cannot give him those qualifications. You cannot make a silk purse out of a sow's ear. Nothing is more appalling to a young lawyer, I suppose, than his first case. He comes out of a law school; he has never practised law. A man gives him a case, and the young lawyer is almost sick. It does not follow from that, that the law will allow that law student to practise before he is admitted to the bar. The curse of the New York Legislature is that it tries to provide for every conceivable infinitesimal point that the wit of man can imagine. You cannot do that, and the more you try the more you handicap men in their ordinary functions of life. The application of the law to what happens inside the college, and what happens outside of it, can only be made as cases arise. You cannot go before a court and say, "We have come here with a sophomoric or academic question, and we want it decided." The court would say, "Come back when question of damages is to be determined." As a general rule, the statute says you cannot practise dentistry, you cannot set yourself up as a dentist unless you are qualified; but the law does not say to me that I cannot tell my suffering friend to put a hot raisin against the side of his tooth to relieve his suffering, or make any other suggestion equally good or bad, or even help a dentist in a case of emergency. The statute aims to prevent a practice, not to punish a single act performer, with no intent of repetition or to violate the law.

A vote of thanks was offered to Mr. Purrington and those gentlemen who took part in the discussion.

Adjourned.

JOHN I. HART, D.D.S.

Editor New York Odontological Society.

NEW YORK INSTITUTE OF STOMATOLOGY.

A MEETING of the New York Institute of Stomatology was held at the residence of Dr. C. A. Woodward, No. 49 West Forty-sixth Street, Friday evening, April 19, 1895, Dr. J. Stedman Converse presiding.

The Chairman.—Gentlemen, we will omit Communications on Theory and Practice this evening and listen to Dr. Allan, who will make a statement for the members of the Institute.

Dr. Geo. S. Allan.—It has seemed wise to the gentlemen interested in this movement to state briefly their reasons for starting a new society, why they think it has a right to live, and why they believe that it will grow and prosper.

In the name chosen and in the plan of organization we would recognize, first, the enlarged position which the profession occupies to-day, and, second, our purpose to make the educational idea the most prominent one. We purpose to occupy the dual position of pupil and teacher, and to make our organic law broad and deep enough to compass all the possibilities of the future. The word "stomatology" better represents the status of the profession to-day than does the more familiar one "dentistry," and it defines more exactly the true position of dentistry as a specialty of medicine.

As all sciences are closely related and interdependent, and no one can grow as a whole or in its units (its members) standing alone, so this institute will seek to bring the science of dentistry into closer relations with all other sciences, kindred ones especially, by opening its doors to all who can bring food or encouragement by adding to our knowledge or enlarging our powers of thought.

As an institute we hope to obtain all the modern facilities for acquiring and imparting knowledge respecting our science. This naturally means the ownership of a library and museum, a place for work and study, and it especially means favoring a college based on the fact that as dentistry is a specialty of medicine so the graduates of the dental school must be in truth as well as name "doctors of medicine."

If a society would be strong it must in all things be subordinated to the principle and the purpose upon which it has been founded. Great care, moreover, must be taken at the outset to eliminate all sources of weakness and discord, and to encourage whatever will give strength and power.

As our sole ambition is centred in the welfare and growth of

the profession, individual claims must be based not upon personal grounds, but upon the amount of good done for the common cause. Society politics and log-rolling for position will be made impossible; too often have we witnessed their disintegrating and baneful effects.

This movement is in no way a hostile one; not only do we not antagonize any existing society, but we, on the contrary, recognize and appreciate all their good work, both of past and present. The reading and discussing of papers, and the holding of clinics is essential and valuable, and we have no expectation of dropping or of slighting them. We do not, however, purpose to make these either our sole or our most important work. We hope to attain our ends to a great extent by other means.

Actuated as we are by common thoughts and aims, we think it better to start anew than to attempt to force new ideas into prominence in either of the older organizations. In this way we hope to avoid the objections and antagonism of those who simply do not see things as we see them, and who would rather, therefore, walk in their accustomed way than follow in our footsteps. The Institute as far as possible will be composed of workers, and all those who will work for the common cause will be gladly welcomed. But they must be in sympathy with us and wear the same harness.

The Chairman.—Gentlemen, I have the pleasure of introducing Professor Henry F. Osborn, of the Department of Biology, Columbia College, who will deliver an address upon the subject, "The History of the Cusps of the Human Molar Teeth."

(For Professor Osborn's paper, see page 389.)

DISCUSSION.

The Chairman.—Gentlemen, Professor Osborn's scientific paper is before you for discussion, and I hope many will participate. We have with us this evening Professor Peirce, of Philadelphia; we would like to hear from him on this subject.

Dr. C. N. Peirce.—Mr. Chairman, before responding to your invitation it will give me great pleasure to introduce to you Dr. J. L. Wortman, of your own city, a gentleman to whom the dental profession is indebted for one of the most complete papers on the comparative anatomy of the teeth that has ever been published, and the only one of any importance found in a publication of this country.

Dr. J. L. Wortman.—Mr. President and gentlemen, I certainly do not know what I can add to the remarks that have been already made by Professor Osborn, unless I may be permitted to say some-

thing more in regard to the general bearing of this view of the origin of multicuspoid or complex teeth of the mammalia from the tritubercular form. When I say the tritubercular form, I do not mean to state that this is by any means the lowest or simplest form to which the structure of mammalian teeth can be traced, but it rather represents a stage in tooth-evolution which was at least exceedingly common to the mammals in early geological times, and to which the evidence of palæontology leads us apparently with irresistible force. If, therefore, multicuspoid teeth have originated from tricuspid forms, it is but fair to presume that these in turn have gradually arisen from still simpler types, and we consequently go back to the unicuspid form as the common ancestor of all. The evidence of the evolution of the tricuspid form from the unicuspid, however, is not so strong nor conclusive as it is of the multicuspoid from the tricuspid or tritubercular.

I am aware of the fact that there are some objections to this view, and I often think that they are very serious objections. One of these objections is that among the earliest mammals of which we have any knowledge we meet with forms (*Plagiaulacidæ*) whose teeth are almost, if not quite, as complex in structure, so far as the number of cusps is concerned, as the most specialized forms living to-day. The whole group is, in fact, known as the *Multituberculata*, which gives you at once a clue to the complexity of their molars.

Now, if we attempt to explain this early, complex tooth upon the hypothesis that it has originated from a single cone, allowing the same rate of evolution as we do for the later forms of equal complexity, we will be compelled to place the origin of the mammalia so far back in time as to do violence to the facts. We must either suppose that its evolution was exceedingly rapid or that it was derived from a form which had already become complex in its reptilian ancestors. This latter alternative involves a polyphyletic origin of the mammalian group, which I think is not wholly unwarranted by the evidence already in our possession. We would have then one group of mammals springing from reptiles with comparatively simple, more or less conical teeth, and another coming from reptilian forms with complex teeth.

With reference to the complexity of the teeth among the lower forms of the vertebrata, I will say that it is by no means an unusual occurrence; I have only to call to your attention such examples as *Notidanus* and *Cestracion* among the sharks, the teeth of the *Chimaeroids* and *Rays* among an allied group, the teeth of the "lung fishes" (*Dipnoans*), and lastly the complex teeth of many

of the Theromorph reptiles, which might easily have given origin to the Multituberculate mammals. It is, indeed, highly improbable that such structures as the complex teeth of these lower forms I have just mentioned, with the possible exception of those of the Theromorph reptiles, have anything like the same history as the multicuspid teeth of the mammal. In one the complexity was probably impressed upon it while it was yet intimately connected with the skin, while in the other it was only after it had developed a fixed connection with the bones taking part in the boundary of the mouth cavity; and this primitive structure we have reason to believe was a simple cone.

Taking this as our starting-point, therefore, in the developmental history of the mammalian tooth, let us examine briefly the two hypotheses to which Professor Osborn has just called your attention,—viz., cusp addition by means of a union of two or more of these primitive cones; the theory of concrescence, or cusp addition by means of outgrowths from different parts of the primitive cone, the implied hypothesis of the tritubercular theory. In reviewing the evidence in favor of each of these hypotheses, I do not know as I can do better than recall a remark that was once made to me by a very distinguished student of biology many years ago, before I understood much of the doctrine of evolution. I asked him, "What do you consider to be the strongest evidence in favor of evolution?" His reply was this: "If we look at the evidence from the stand-point from which Mr. Darwin has so elaborately reviewed it, a study of the living forms, the truth of the hypothesis is rendered possible. If we look at the evidence from the stand-point of embryology, a study of the becoming of the individual, then the truth of the hypothesis is rendered highly probable; but if we examine the evidence from the stand-point of palæontology, a study of the remains of individuals that have actually existed in past time, then the truth of the hypothesis is rendered absolutely certain." I quote this remark simply to show you the relative value of the evidence drawn from these various sources in determining the evolution of any organ or set of organs whose development we seek to explain.

Fortunately, the geological record has now approached that stage of completion which enables us to construct at least a part of the pylogenetic history of a number of important groups of mammals with an unusual degree of certainty, and from them we can gather some very direct and positive evidence regarding the evolution of the teeth. I will mention a few examples which are

doubtless well known to you: these are the horses, rhinoceroses, tapirs, and the Titanotheres, although numerous others could be given. In them we note that in the earliest forms the premolars are simple, and that as evolution advanced they gradually assumed the complexity of the molars. These new additions, which were made to these originally simple, more or less conical, teeth, began as minute cuspules, ridges, etc., and we can actually see in a succession of species at what point and in what manner the additions were made. They were not developed by the union of separate and distinct tooth-germs, but were made by outgrowths to the single cone already in existence. The evidence of this is so powerful, so positive, and so conclusive that it seems to me, so far as these teeth are concerned, at least, there is no room for argument. Now, this is not only true of the evolution of the premolars in the lines I have just mentioned, but it is also true of the premolars of all forms whose tendency was in the direction of complexity. There is yet more: in some forms whose history we can trace with considerable certainty far back into Eocene time, we find not only simple premolars, but the true molars are reduced to the tritubercular pattern. This is seen in the early even-toed ungulates as well as the lemurs. With this I will say our positive and direct knowledge ends, for the reason that beyond this point we are unable to trace the lines of descent with that same accuracy and certainty which we can in the later geological epochs. While it is true that we know many species from the lowermost Eocene, which in all probability were the ancestors of the later types, yet we cannot demonstrate this beyond question until we know more of their entire skeletal structure. It is a significant fact, however, that, barring the Multituberculates, all these forms, with two exceptions, have the molars organized upon the tritubercular pattern.

When we go beyond the Eocene into the Cretaceous, Jurassic, and Triassic formations, we meet with mammalian remains representing a number of different species, but they are known only from the most fragmentary specimens. It is impossible to trace phyletic lines among them, in consequence of which any deductions which we draw from a study of their teeth are more or less speculative.

Turning now to the other hypothesis, or that of conerescence, we find that the evidence is almost entirely of a speculative or a negative character. The only positive evidence which has yet been advanced in its favor is drawn from embryology, and this we are led to mistrust, if not reject altogether, as either misleading

or useless. The most earnest advocate of this view, Dr. Carl Rose, has discovered that the various cusps of a mammalian molar begin to calcify at so many separate points, just as you have separate centres of ossification in a compound bone. He concludes from this that each one of these separate points of calcification represents an originally separate and distinct tooth-germ. This view he believes to be further strengthened by the fact that the dates at which calcification of these various cusps begins are slightly different.

Let us examine this question of the development of a single tooth a little more in detail and see, if possible, what bearing it has upon this theory. You are all so familiar with this process, I take it, that I need mention only the leading facts. You know, for example, how the enamel organ is formed, and you know also how the dentinal papilla is formed, and it strikes me as an exceedingly curious circumstance that if embryology is going to give us any light upon this question it should be so singularly silent at the very point where we would most naturally expect to find the evidence if this theory of concrescence is true. With all that has been written on the subject of the development of the teeth, including the researches of Röse, Kükenthal, Leche, Fleischmann, and others, the dentinal papilla has never been observed to consist of more than a single body from the very moment it begins to grow. If it is a compound body, representing the coalescence of a number of separate dentine germs, why, may I ask, do we not get some evidence of this union when it is first formed? What is here said of the dental papilla applies with equal force to the enamel organ. It, too, always arises as a single and not a multiple diverticulum of the parent fold. The fact that calcification begins at several points in either the enamel germ or the dental papilla or both, I do not regard as any proof whatever that either is a compound structure, especially when we consider that both arise as single organs.

This process of calcification, I am led to believe, belongs in the same category as the ossification of a bone. Take the humerus, for example, in the human body, and we find no less than seven centres where the lime-salts commence to be deposited. In the shaft, ossification begins at about the fifth week of fetal life, in the head at from the first to the second year, in the internal condyle at about the fifth year, in the external condyle at the thirteenth or fourteenth year, and so on. Again, if we study the human femur we will find that there are five centres of ossification, which appear all the way from the fifth week to the fourth year of

the life of the individual. Now, who has ever ventured to assert from these facts that either of these bones is a compound bone, made up in the one case of five and in the other of seven elements, and that the time they commence to ossify has anything whatever to do with the order in which they have been added? What ancestor of the human family had such a remarkable femur or humerus as to be composed of five or seven separate bones? By this I do not mean to assert that the centres from which bones commence to ossify is without its special value in the determination of the homologies of parts in many cases, but at the same time there is much evidence of this character that is worthless and meaningless, and I am inclined to regard this evidence of calcification of the tooth-germ as coming entirely within this domain. Truly, gentlemen, I cannot see any evidence for such a view.

Dr. C. N. Peirce.—Mr. Chairman, I want to express my gratification in being with you this evening and the very great pleasure I have had in listening to the addresses of Professor Osborn and Dr. Wortman. I have been well compensated for my little trip here from Philadelphia.

Accepting as I do the theory of evolution, I can agree most emphatically with the theory that has been suggested this evening of the derivation of the more complex teeth from the simple.

If you will pardon me, I want to make some allusion to an occasional condition found at the present day, believing it has some bearing upon the subject under discussion. It is not uncommon to hear certain aberrations in development spoken of as a reversion to an ancestral type, and one of these mal-developments is the congenital union of the crowns of both the deciduous and permanent anterior teeth, the incisors only being involved in it. The posterior teeth,—molars and bicuspids,—if ever, are so rarely united in their crowns (congenital) that they have escaped recognition in this form of union, though union of their roots, an acquired union, is frequently observed. That this abnormality should be confined to the anterior teeth I have thought rather remarkable, unless it can be attributed to the crowding of these germs, while the posterior teeth are in their development less under this influence.

Some years ago I published a little paper, in which I stated that while the anterior teeth were liable to this abnormality, it was never recognized in the posterior; some few weeks after the publication I received from a gentleman in Virginia a tooth; he said he sent it because it represented the union of two bicuspids

which had been filled with gold, and it proved my statement to be incorrect. I wrote him at once that I had received his specimen, and that it was well filled, but that I judged his patient grunted when it was extracted, though of one of the first families. The union of bicuspid I have never seen. The molars of the pig do very much resemble the union of two human bicuspid.

I certainly can add nothing to what has been said regarding the formation of the teeth; but the question comes constantly in my mind as to what has been the factor that has induced this modification. Has it been the food habit, and the movements of the lower jaw upon the upper? I certainly have so surmised. Some of you may recall an article I published in the *Dental Cosmos* a few years since; it was a synopsis of a paper by the late Dr. John A. Ryder on this subject. He prepared quite an extensive essay, well illustrated, showing the influence of the lower teeth upon the upper. It was his belief that the movements of the lower jaw and the impact of the teeth upon each other had modified the physical character of the teeth. The paper was entitled "The Mechanical Genesis of Tooth Forms," and was certainly a very interesting one, showing that the movement of the inferior upon the superior jaw certainly had had a marked influence in the arrangement of the cusps of the molars. When we see the change from a simple cone to the complex tooth, we ask, very naturally, What has been the factor that has induced it? Has it been due to a modification of food, and with this a modification in the movements of the lower jaw upon the upper?

It has always been a great satisfaction to me to feel that the *Lamarckian* theory of use and disuse was a correct interpretation of a great factor in the organization of structures. And believing firmly in this, I have looked upon the food habit as the factor in the development or evolution of the complex tooth from the simple cone, and also recognized its influence in the number and arrangement of the cusps. This theory has been very useful to me in my practice, and as I am talking mostly to dentists, I may touch upon the practical side of this question. I have recognized the fact that where patients use their teeth for the trituration of hard substances, they were in much better condition than where this use of the teeth was much neglected and the food simply bolted with moisture and without mastication. It has been my habit to urge patients that the use of their teeth was essential to their preservation, and to impress upon parents the fact that the proper development, as well as the preservation, of their children's teeth required that they

should take their food dry, with plenty of time for its thorough mastication. I have certainly recognized a very great change for the better in the condition of the mouths of patients, so far as preservation of the teeth is concerned, since I have insisted that the natural use of the teeth should be observed in the proper mastication of the food.

I would like to ask Professor Osborn to give us what he deems the important factor or factors in the modification of simple cones into complex teeth; whether he does not think that the fulfilment of the Lamareckian theory has been instrumental in making the changes. It has always been a theory of mine that such was the case, and that the shape of the teeth was largely due to their use, believing that use and disuse were very important factors in the status of the teeth.

Dr. Osborn.—Mr. Chairman, I am very glad that Dr. Peirce has asked that question, because I think it is undoubtedly the case, as he has observed in his practice, that the teeth are modified by use. A comparison of the teeth of savages with those of Europeans will support that conclusion. Savages usually chew hard food, or, like the Australians, use their teeth in place of tools; and their teeth are found in fine condition, often completely worn down. The teeth of the Australians are often found to be worn down almost to the gums, with little decay, while the teeth of Europeans and Americans are little worn and much decayed in comparison, as you know. It is undoubtedly the case, as Dr. Peirce has suggested, and as the late Professor Ryder worked out beautifully, that the points of maximum use in the teeth are points in which the new cusps appear. When you look at the posterior lingual in the upper molars, for instance, you see that this cusp corresponds to the point at which the primitive anterior lingual would come in contact. So that use of the teeth seems to have brought about an increased amount of wear. In some of the monkeys' teeth which I have observed, in the later Eocene period, the upper teeth have somewhat of a triangular form.

You remember what I said in regard to the loss of the primitive anterior lingual in the lower molars; that has been one of the greatest difficulties we have met with in the application of this "use" hypothesis. When we go back to the complete triangle here in the lower jaw, the primitive anterior lingual will evidently wear against the posterior base of the anterior palatal in the upper jaw, and the point will be worn down or bear the maximum wear. Now, here comes the difficulty: as the new posterior

palatal in the upper molar develops, the primitive anterior lingual in the lower molar disappears; so that we have one cusp constantly getting larger and the other rubbing against it but constantly getting smaller, until finally the latter disappears entirely from the human molar and the former becomes very large. Now, this is a mechanical paradox, because it is obvious that the action and reaction between the lower cusp and the upper must have been equal. There are a number of facts of this kind which make it very difficult to apply this mechanical theory to the development of tooth forms. Looking at certain facts, you find that everything points towards the mechanical theory of cusp development, but when you go through the whole scale of the different types and analyze each case you meet many difficulties. My whole inclination is towards the mechanical theory; it seems a most beautiful theory, and as an evolutionist who believes that things are worked out according to certain laws and not wholly by chance, so as to provide for the survival of the fittest, I find plenty of fitness in this theory. You find that use of parts of the body improves them, and if we apply that use of parts and the consequent improvement through heredity we have an explanation of the origin of a great many useful and beautiful adaptations in nature. We notice that our big toe is very much larger than it was and the little toe is disappearing, so that ultimately we are becoming one-toed animals. That is because we have learned to walk on the inner side of the foot, the weight of the body resting on the great toe, so that the main resistance comes against the great toe; that is a mechanical explanation of the fact that in all civilized races the great toe has become very much larger than the little one.

It seems to me, however, that whenever we apply a theory to every case, we do meet with some very great difficulties.

Dr. Peirce.—In the development of the cusp of the first molar especially we have the anterior buccal cusp calcified first, then comes the posterior buccal, and next the anterior palatal in the upper molar. The anterior buccal cusp is the first, and the three are invariably calcified before the fourth distal palatine.

Dr. Osborn.—In the upper molar?

Dr. Peirce.—It is a significant fact that we oftentimes find small spurs on the molar teeth, anterior spurs, more frequently on the antero-palatal surface than on the buccal; so we have what you might call five- or six-cusp teeth at times.

Then in the development of the teeth where one tooth is impacted between two others and is making its way gradually to its

place, that tooth is modified in shape by the impact of the other teeth; there is not an imaginary but a real compression of the crown of the tooth, so that it is fitted compactly in between two other teeth.

Dr. Osborn.—In regard to that anterior spur that Dr. Peirce has spoken of, it is a very interesting element in the comparative anatomy of the teeth. It occurs at the anterior base of the anterior upper lingual, does it not?

Dr. Peirce.—Yes.

Dr. Osborn.—That spur is found in a large number of the lower forms of mammals. In some forms it is a persistent feature of the teeth, and occurs as a family characteristic, but in some species it seems to occur occasionally only as a spur. I think it indicates that there is a latent tendency to develop a cusp at that point. In a large number of types of animals you will find that spur strongly developed.

You have no idea, gentlemen, how important and valuable are the observations which you make in your practice or how interesting they are to the comparative anatomist. It is the one great drawback of modern specialization that the specialist has gone so far in a particular direction away from the general practitioner that men are not brought together sufficiently to compare notes; and I think one of the great services that a society like this can render is by the publication of observations, so that others may have the opportunity of seeing the bearing of these points, such as the development of the wisdom-teeth, the development of the anterior and posterior teeth, the order of calcification of cusps, and the occasional appearance of a third series of teeth in the jaw. The evidence of a third series of teeth was first noticed, I believe, by a practising dentist, and now it has been positively shown that some of the mammalia exhibit vestiges of a third set of teeth, for underneath the permanent bicuspid are the rudiments of a third series that sometimes come to the surface. If scattered observations could only be collected, so that you gentlemen of the dental profession could take advantage of our observations and we could take advantage of the observations that you make, then dental science would progress very much more rapidly than it does.

The Chairman.—We would be pleased to have Dr. Stebbins address us upon this subject.

Dr. R. O. Stebbins.—Mr. Chairman, calling attention particularly to the condition of these teeth [referring to an Eskimo skull and denture], it will be noticed that the incisor teeth, as a rule,

are large and very blunt, which accounts for the statement made in several reports that the natives had double teeth all around. It was my pleasure to visit the far North last summer and ascertain the true character of the Eskimo teeth, both of the original race and the present tribe of natives known as Danish Eskimos or Greenlanders.

Originally the natives lived entirely on fish and flesh, having no vegetable or bread-stuff of any kind. They did not cook their food, using their incisor teeth to cut off bits of meat or fish, and swallowing it immediately. Their molar teeth did not come into play as masticators, which would account for the wearing away of the front teeth; also, their manner of dressing bird and other skins, which is accomplished by constantly chewing the skin to make it pliable, tearing off bits of flesh, and sucking the oil and grease out.

Skins thus prepared are beautifully cured at the expense of wearing the teeth away. The statement that the Eskimos live on blubber is partly true: through the long Arctic nights they eat blubber and drink oil to keep warm, while through the corresponding long day they subsist on raw fish and flesh.

On one occasion we caught some trout, and were asked by a little fellow if he could have one to eat: he grasped it by the head, and, biting off a piece of the fish, which was wriggling in his hand, gulped it down, and then another piece, till he had swallowed the entire fish.

Since the Danish government has introduced vegetables and bread-stuffs, together with the cook-stove, the natives cook more or less of their food, which they have to chew, as they cannot swallow bread without mixing saliva with it to assist digestion, which is not the case with a meat and fish diet exclusively. I took twenty-eight impressions of teeth, from childhood to old age, making plaster casts of both upper and lower jaws. I also visited some of the old graveyards, which are found on the mountain-sides, to obtain skulls. There being no earth, and consequently no trees of any kind, the bodies are covered with moss and stones. The Greenlanders or present tribe of Danish Eskimos bury their dead near the water's edge.

In many cases the first- or sixth-year molar teeth were decayed, while not a sign of decay was found in other teeth in the same mouth. Since the present natives chew their cooked food, one notices that the upper incisor teeth project over the lower teeth, which was rarely the case in the older tribes.

Dr. Allen.—Mr. President, I am very glad that on our opening night our proposed work has been brought to the front in such an admirable shape, and I am sure we will pursue it harmoniously.

I had some manuscript with me, but the lateness of the hour prevents me from making use of it now.

Professor Osborn has anticipated some of the questions that I wanted to ask, but I would like to ask Dr. Wortman, who referred to Dr. Carl Rösé's ideas about the fusing together of separate teeth to form the multicuspid tooth that we have in the human molars, whether the embryonic conditions that Dr. Carl Rösé gives such great importance to have been fully answered by Professor Osborn or not. I am not in a position to answer. One thing that Dr. Wortman said struck me as a little peculiar,—that the development of the cusps proceeded, as you might say, harmoniously. If I had been asked that question I should have said no, but I am not certain about it. My impression is that histological observations would confirm Dr. Carl Rösé's idea, that they do not proceed harmoniously, or, rather, do not start precisely at the same time and proceed at the same rate in the calcification. One thing is certain, whether the cusps commence calcification at the same moment or not, it is true that they do not proceed with the same rapidity; calcification proceeds faster in some cusps than it does in others. Where the cusps come together and coalesce we have fissures that are the bane of the dentist's life: there is a more or less open crack, which invites decay and makes trouble. Now, that would in some way seem to suggest the thought that possibly single cusps, in their fusion together to form a multicuspid tooth has some foundation from a histological standpoint. I cannot, of course, give any opinion upon it, but I would like to know what bearing it has on this theory of development.

Dr. Wortman.—I will say that I feel the importance of the evidence that embryology furnishes us, in many cases, when we are going to trace the evolution of this or that part of an animal structure; in a majority of instances embryology will give us a clew. I cannot say that I am myself an expert on the subject of development of the teeth, although I have studied the subject with some care. In searching the literature on this question at the time I was engaged on my work I failed to find any evidence that there was a difference in the time that the different tooth-cusps appear. Taking into consideration the statements of Tomes, who was the last writer on the subject at the time of my publication (1886), I was led to reject the idea that embryology gives us any

clew whatever to the history of cusp addition. And when we come to review the subject in the light of these more recent investigations, I do not see that the evidence derived from this source has been materially strengthened.

Dr. J. Morgan Howe.—Mr. Chairman, I wish to express the great interest and pleasure I have had in this lecture of Professor Osborn's, and in the discussion of it, both by Dr. Wortman and Professor Peirce; and I move a vote of thanks to each one of these gentlemen for the trouble and care that they have taken in presenting this subject to us this evening.

Dr. Howe's motion was carried.

Adjourned.

S. E. DAVENPORT, D.D.S., M.D.S.,
Editor pro tem., New York Institute of Stomatology.

Editorial.

QUESTIONS AND ANSWERS.

THERE has arisen in the past few years in dentistry a method, peculiar to itself and it is believed to this country, of interrogating individuals upon professional problems for the benefit of dental societies, journals, and individuals. These generally are limited to some special practice, but frequently are extended into the domain of pathology, bacteriology, and histology.

This method of arriving at truth has its good and bad side, the latter promising to overcome the former and become a serious menace to more thorough work.

It had its origin in the, perhaps, laudable idea of concentrating the practice of many men and deducing therefrom a positive method, and thereby settling many pathological and therapeutical difficulties. To accomplish this parties have been delegated by certain journals to interview teachers in colleges and others by letter in which questions were enclosed. The recipients were supposed to have sufficient love of approbation and desire to aid their fellow-practitioners to induce them to sacrifice a portion of their valuable time to enlighten the world as to their methods of practice in peculiar cases. This altruistic work being duly appreciated, the

idea extended to other individuals and journals, until the whole matter has become a serious burden in every direction.

Having passed through the individual and local society stage, this system finally reached the dignity of national consideration, and, very naturally, was adopted by the American Dental Association as part of its work. It was presumed that through this a consensus of opinion could be obtained which would result in the solution of many problems in practice. A committee was appointed from this body to prepare questions to be sent down to subordinate societies, and to be discussed at the regular meetings during the winter. It was expected that a condensed summary of these discussions would be made, and the result furnished the members of the American Dental Association at a subsequent meeting.

The result of this action has been a curious admixture of fact and verbiage, with absolutely no conclusions worthy the name. We have read many of these discussions with a commingled feeling of amusement and regret, and it is difficult to decide which one of these is the most pronounced. It is certainly amusing to note the anxiety manifested to present "our peculiar method of practice," forgetting apparently that, after all, it is not alone through this antiseptic, astringent, or escharotic that conditions are to be met, but rather by an intelligent conception of the philosophy which must govern all treatment. The regret must be felt that so much valuable strength is put forth with such unsatisfactory results.

While these questions have been annually sent out by the American Dental Association, without much good having been accomplished, there has been a result of positive value, that of binding subordinate bodies to the parent organization, but whether this is sufficient to warrant a continuance must be left to the good judgment of the parties interested.

If the dental world anticipated any great results from this method of arriving at truth, there must have been by this time a positive disappointment experienced. No one has been enlightened, we imagine, as to the best course to pursue in pulp treatment or the proper method to pursue in sterilization by the discussion, nor are we any nearer the truth than we were at the beginning. We read with interest the plans adopted by our colleagues, and generally end by continuing our own.

It is possible to have a series of questions result in positive value, but the method of answering should be changed. We can conceive of a system by which questions propounded by the Amer-

ican Dental Association might be answered by certain committees,—the committees given power to expend necessary funds to carry on investigations throughout the year. If this work were faithfully performed, there can be no doubt but that the end of the year would find a decidedly more intelligent conception of various subjects. The American Dental Association has expended a considerable sum in valuable work under the direction of the late lamented Dr. Patrick, and this might be extended to other investigations. We can imagine a committee that would do the work thoroughly, and while, possibly, not reaching definite conclusions on all points would, at least, give us an intelligent basis for future work.

The time is approaching for the annual gatherings, and it would be well to have the main question discussed, whether or not the present method has not had its day? The answer to this, it seems to us, should be in the affirmative. As a transition means it has served a good purpose, but to arrive at truth we must question nature in her deeper mysteries, and the answer we will receive will be more satisfactory than that formulated on the "I think" or "I believe" principle, so generally adopted in treating intricate problems.

If societies, journals, and individuals would cease wasting time in this vain pursuit after knowledge and adopt the only true way, positive investigation, intelligence would be increased, and the dental profession would far more rapidly advance to the domain of positive knowledge.

THE ANNUAL CONVENTIONS.

THE period for the convening of the members of the various conventions is near at hand. We presume all who have, heretofore, made it a part of their yearly duties to be present at one or more of these will not neglect it now. There is a large indifferent class who reluctantly go anywhere, and especially to a dental convention. These need to be infused with a higher degree of professional spirit, and this can best be secured by commingling with their fellows in meetings of this character.

The American Dental Association meets this year at Asbury Park. This place, as a sea side resort, has no superior on the New Jersey coast, and the occasion should be made an enjoyable one aside from that derived from professional association. Every effort

is being put forth to make it a memorable meeting. The promise of a large attendance seems to be assured.

The several bodies which annually gather at the same place, as the American Dental Association, the National Association of Dental Faculties, and the National Association of Dental Examiners, will be fully attended. These organizations are growing yearly in importance and power, and will require wise management that this be not exceeded.

The annual State meetings occurring at this season of the year will be held at periods not to interfere with the National organization.

The meeting of the Southern Dental Association will take place October 1.

The American Dental Society of Europe will meet at Boulogne-sur-Mer, France, August 5, 6, and 7, 1895. Those of the "professional brethren who may be spending their holidays in Europe are cordially invited to make their plans to be present."

PENNSYLVANIA STATE DENTAL SOCIETY.

WE are requested to call special attention to this meeting, to take place at Eagles' Mere, Pennsylvania, July 9, 10, and 11.

The dental profession in this State should make an unusual effort to have this a gathering of great interest. The programme includes a series of papers of unusual promise, and it only needs the encouragement of a large attendance to bring this convention up to the vigor of earlier years. There will be a large delegation of eastern members in attendance. It is to be regretted that our colleagues in the western part of the State will have difficulty in reaching the place selected. It is certainly not a convenient location, however beautiful it may be, and it is hoped that a locality more easily accessible may be fixed upon for the meeting next year, 1896, and the years to follow.

Obituary.

DR. ARNOLD C. HAWES.

On the 7th day of April last, Dr. Arnold C. Hawes, one of the earliest and most esteemed members of the New York Odontological Society, entered into his final rest.

Soon after the formation of the Society he was elected an active member, and so continued until he retired from practice and took up his residence at his country-seat in Connecticut. He then tendered his resignation and was made an honorary member.

Dr. Hawes was one of the founders of the First District Dental Society: its first vice-president and second president. He was one of the original members of the Dental Society of the State of New York, and for many years its treasurer. He was among the first members of the American Dental Association, and for a time served as treasurer of that organization.

Dr. Hawes was one of the most prominent and best respected members of our specialty: a man of sterling integrity, with generous impulses and candid manners. He was much interested in the work of our professional associations, and especially so in this, his favored society. He was also an occasional contributor of articles for our dental journals.

Most of the gentlemen present will remember his ever-genial, smiling face, and the warm grasp of his friendly hand. He was a model of good nature, winning the respect and love of all who knew him. You will, perhaps, also remember that for many months Dr. Hawes was almost totally blind, yet he bore his misfortune with a remarkable degree of cheerfulness; and when by a surgical operation his sight was partly restored, his joy and gratitude seemed unbounded.

In view of the departure of our late friend and fellow-member, it is fitting that we record our high appreciation of his excellent character as a gentleman and professional worker. Therefore be it

Resolved, That while we mourn the loss of one who for so long a time was our intimate associate, and who by his cheerful spirit and kindly disposition endeared himself to his friends and fellow-members, we are devoutly thankful

that it was our privilege to enjoy his genial companionship and to have been classed among his friends. And in our affectionate remembrance comes also the cheering thought that he led a good and useful life, and earned an honorable record.

CHARLES E. FRANCIS,
C. A. WOODWARD,
ALBERT H. BROCKWAY,
Committee.

DR. THOMAS H. MUSGROVE.

DIED at Philadelphia, April 1, 1895, of pneumonia, Thomas H. Musgrove, D.D.S., in the sixty-third year of his age.

Dr. Musgrove was born in Newark, New Castle County, Delaware, September 7, 1832. He received his early education at the academy in his native town. When about eighteen or nineteen years of age he began the study of dentistry with Drs. Haines and McKorran, of Newark, Delaware. After completing his pupilage he located in Tuscaloosa, Alabama, where he remained but a year in consequence of ill health. Returning north, he located in Elkton, Maryland, where he pursued his professional work until the breaking out of the Civil War in 1861. Dr. Musgrove cast his lot with the Southern Confederacy, and in company with two companions succeeded in reaching Richmond, where he joined the Army of Northern Virginia. He remained in that service, experiencing many hardships, until the autumn of 1864, when, hearing of the serious illness of his aged father, he resolved to reach home at any risk. Obtaining a furlough to visit the far South, he turned his face northward instead, and after many weary days and nights of travel, much of the way on foot, he succeeded in reaching Washington and Baltimore. He was arrested in Baltimore as a rebel spy, was thrown into prison, and kept in close confinement until the spring of 1865, when, through the influence of friends, his case was presented in all its details to President Lincoln. His pardon was signed, and he was liberated but a few weeks before Mr. Lincoln's assassination. Dr. Musgrove was a brave soldier, and during his service in the Confederate ranks endured hardships which would break the spirit of men less courageous than he.

At the close of the war he again located in Elkton, Maryland, and continued in practice there until 1872, when he removed to Philadelphia and associated himself with the late Dr. Daniel Neall,

with whom he remained for a period of four years. He then established himself in practice, and enjoyed the confidence and respect of all who sought his services until the day of his death. Dr. Musgrove was a modest, retiring man, a true friend, a devoted son to his widowed mother, a loving brother, and an honest man.

E. T. D.

DR. ELISHA G. TUCKER.

THE passing away of an active member of the dental profession is always of serious moment to his colleagues, as it means a vacant place and a proportionate loss to the well-being of the organization. This feeling should be peculiarly prominent when one by one the earlier workers, the fathers, as we love to call them, are passing on to their great reward.

It is with sentiments of unusual regret that we chronicle the death of Dr. Elisha G. Tucker. While long passed the age usually allotted to men, he has been continually active and most affectionately regarded by his immediate colleagues, and the profession generally, as one of the very few who represented the earnest work of the first half of the present century, a period fraught with a larger amount of development in the practical side of dentistry than any since, and in which Dr. Tucker took a most prominent and worthy part.

We are on the threshold of another century, and as the silent reaper is gathering in the ripened harvest of this, let us indulge the hope that the example of this noble life may extend into the next century, unfolding through its inspirations increase of power and fuller development in those things which made Dr. Tucker great in his generation.

Elisha G. Tucker was born in Winchendon, Massachusetts, August 18, 1808. He received the degree of M.D. at the Berkshire Medical College, Pittsfield, Massachusetts, in 1837.

In 1838 he formed a copartnership in New York with the late Joseph H. Foster, M.D., buying out the practice of Dr. Horace Kimball, of Park Place, New York.

He removed to Boston in 1841 and joined his brother, Dr. Joshua Tucker, the connection proving eminently successful. This continued for ten years, or until 1851, when he decided to pursue his profession alone.

He was a member of the American Society of Dental Surgeons, and delivered a lecture at Newport, Rhode Island, in 1846, on the use and application of rubber rings designed for irregularities of the teeth.

In 1857 he was elected Vice-President of the American Dental Convention assembled at Boston.

He was deeply interested in the American Academy of Dental Science, of Boston, and was one of the founders of that society, and was successively treasurer, chairman of the Board of Censors, and subsequently was for two years the presiding officer of the Academy. He was at a later period elected an honorary member.

He was married in 1843 to Elizabeth M. Harris, of Portsmouth, New Hampshire.

His son, Winslow Lewis Tucker, became associated with his father in 1872.

He leaves a widow and an only son.

Current News.

AMERICAN DENTAL ASSOCIATION MEETING.

THE Local Committee have made arrangements with the following hotels and houses for the session of the American Dental Association, commencing Tuesday, August 6, 1895. The "Coleman House," fronting the ocean, the largest hotel in Asbury Park, with rates \$3.50 to \$4.00 per day, and the use of the ballroom at stated periods of the day and evening for large committee meetings and sections. The "West End Hotel," a first-class hotel, opposite the "Coleman House," the rates \$2.50 to \$3.00 per day with the use of the ballroom at stated periods for committees and sections. The "Ocean Hotel," next door to the "West End," capacity nine hundred, first-class in every respect, rates based on one hundred or more Dental Convention guests at \$2.50 to \$3.50 per day with the use at stated periods of small parlors for committees. The "Hotel Brunswick," near the ocean front, first-class in every respect, from \$3.00 per day up to \$20.00 per week. This hotel has a series of small parlors on the main floor for committees and private receptions, the use of the same based on the number of Dental Convention guests at the hotel.

In the large hotels the use of the rooms for committees and sections is based on the contract of a certain number of guests, therefore the selection of a room ahead in some hotel is necessary. July 15 is the time most of the hotels would like to know. All hotels have electric lights, baths, and artesian-well water. In the small hotels the rates are: "The Grand Central," \$1.50 to \$2.50 per day and \$14.00 to \$16.00 per week. "The Ashland," \$2.00 per day and \$8.00 to \$12.00 per week. "The Portland," \$2.00 per day and \$8.00 to \$10.00 per week. "The Edgemere," \$2.00 to \$2.50 per day and \$12.00 to \$20.00 per week. "The Neptune," a nice quiet place, \$1.75 to \$2.00 per day and \$9.00 to \$20.00 per week. "The Albany," \$2.00 per day and \$8.00 to \$15.00 per week. "The Clifton," \$2.00 per day and \$15.00 per week. "The Strand," \$2.00 per day and \$10.00 per week.

The committee will have an attendant at the Auditorium from July 27 to August 9, to give information in reference to hotels and other information to inquiring members. The trolley cars run direct from the depot to the Auditorium. A map of Asbury Park, the cuts of the hotels, and the Auditorium will appear in the *New Jersey Programme*, which will be mailed to every member of the American Dental Association.

CHARLES A. MEEKER, *Chairman*,
C. W. F. HOLBROOK,
C. S. STOCKTON,

Local Committee.

PENNSYLVANIA STATE DENTAL SOCIETY.

THE next meeting of the Pennsylvania State Dental Society will be held at Eagle's Mere, Pennsylvania, July 9, 10, and 11, 1895. Hotel accommodations have been secured at reduced rates.

An exceptionally good programme is at present promised, with papers and clinics by men of eminence in the profession.

Business of great importance will be presented and a new constitution is to be acted upon.

Give your profession the benefit of your judgment and make a sacrifice, if need be, to attend. Truly yours,

HOWARD E. ROBERTS,
Corresponding Secretary.

1321 WALNUT STREET, PHILADELPHIA.

AMERICAN DENTAL SOCIETY OF EUROPE.

THE American Dental Society of Europe will hold its twentieth meeting at Boulogne-sur-Mer, France, August 5, 6, and 7, 1895. It is expected that there will be a very full attendance of the members, and that the meeting will be an interesting one. Any professional brethren who may be spending their holidays in Europe are cordially invited to make their plans so as to be present and take part with us at this meeting.

Programmes may be obtained of the President, Dr. Charles W. Jenkins, 1 Sonnenquai, Zürich, Switzerland, or of

DR. J. H. SPAULDING,

Secretary.

4 RUE DE ROME, PARIS.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE annual meeting of this body will be held at Asbury Park, New Jersey, on Saturday, August 3, at ten o'clock A.M. It is urged upon all colleges having membership to be promptly present at that hour, as much important business will be before the Association, and the time allotted is usually short for the work to be done.

The Executive Committee of the Association will meet on Friday previous, at ten o'clock A.M. at the same place. All business for that committee should, so far as possible, be in their hands before the meeting, in order that there be no delay.

J. TAFT,

Chairman Executive Committee.

LOUIS OTTOFY,

Secretary.

MASONIC TEMPLE, CHICAGO, ILL.

TO ARRANGE FOR INTERSTATE MEETING, MISSOURI.

THE committees appointed by the State Associations of Iowa, Nebraska, Colorado, Kansas, and Missouri to arrange for the Interstate Dental Meeting to be held at Excelsior Springs, May, 1896, will meet at Perth Springs, Missouri, July 10, 1895. A full attendance is desired.

J. P. ROOTS,

Chairman General Committee.

S. C. A. RUBEY,

Secretary.

THE International Dental Journal.

VOL. XVI.

AUGUST, 1895.

No. 8.

Original Communications.¹

DENTAL AND FACIAL ORTHOPEDIA.²

BY CALVIN S. CASE, D.D.S., M.D., CHICAGO.

IN accepting the invitation of your Executive Committee to read a paper at this meeting, I have come with no expectation of presenting ideas that are entirely new, or that have not been presented by me and published in various places; but rather with the hope that I may more thoroughly convince you, by a careful examination of my models, of the importance and practicability of certain possibilities in applying force to the teeth, that will enable us, as dentists, to correct many imperfections and deformities of the face that have heretofore been considered impossible. I trust you will not consider this branch of facial orthopædia beyond the province of our profession, when you remember the wonders that have already been accomplished in this and every auxiliary department of dental science, and which have done much within the past few years to increase the scope of our professional attainments, beyond the mechanical practice of filling and inserting artificial teeth, to a position of the highest honor among the sciences.

Orthopædic surgery, as you are aware, is that branch of surgical

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the New York Odontological Society, March 19, 1895.

science which has for its object the correction of deformities. As it deals largely with those deformities of youth which are the result of an imperfect development of the osseous frame, the operations, as in orthodontia, mainly consist in the employment of mechanical apparatus, with the view of forcing nature to a restoration or production of a more natural form by a gradual and systematic application of force. Unlike orthodontia, however, one of the greatest difficulties which confronts the orthopædic surgeon, where pressure, tension, or torsion is indicated in particular deformities, is the impossibility of attaching the force appliances directly to the bones themselves, or without the intervention of soft, movable, and sensitive tissues. The limited power of the tissues to withstand continued pressure without the production of serious complications has given rise to a series of ingenious appliances and methods, of which manual and manipulative force play no unimportant part.

Besides the force of inheritance and diseases which produce deformities, it is a well-known fact that in certain vicissitudes of infantile and youthful life where particular parts of the body have been subjected to continued unnatural strain or pressure, the bones are often markedly deflected in their development and growth from assuming their natural form. And it is also as well known in orthopædic surgery that during the ages between five and ten, and often as late as fifteen or eighteen years, the bones yield to the slightest mechanical force, where it can be applied and continued in the direction of the desired movement. This is doubtless due to the cartilaginous condition of the bones before maturity, many of which, according to our best anatomists, are not completely ossified until after the age of eighteen or twenty. (See "Selection and Physical Examination of Recruits," by Charles B. Ewing, M.D., captain and assistant surgeon U.S.A. *Medical Record*, March, 1894.)

Notwithstanding the fact that the bones of the head are subject to the same laws of growth and development as are other bones of the body,—with the possible difference that they mature earlier,—little has been accomplished thus far in general orthopædic surgery for the correction of those facial deformities which are due to an imperfect shape or position of the facial bones; and still less for the perfection of æsthetic facial contours where the natural or inherited condition could hardly be called a deformity, though producing an expression of the features of the face far from attractive. In a conversation with a very prominent orthopædic surgeon in Chicago a few days ago, I asked what had been done in general orthopædia for the correction of deformities of the face. He said actually

nothing had been done, except in very rare instances,—the practice being confined to accidental conditions almost entirely.

This is due, no doubt, principally to the difficulties heretofore presented for applying force to the bones of the face during their growth and development that would tend to give a more perfect facial form,—and it is partly due also to our habit of belief that the features of the face are stamped by inheritance or by the Creator, as they shall or must remain.

However, had some practical and sure method been discovered to accomplish this result, it would soon have eradicated all superstitious notions, considering the natural desire for æsthetic facial perfection so prominent in every one, and particularly with parents for their children.

It is a noteworthy fact that a very little change in the peripheral shape or position of certain bones of the face upon which the features are dependent for their character and form,—a change so trifling it could hardly be measured,—resulting in a slight filling out or depression of certain contours, will often beautify the appearance of a face that would otherwise be quite plain and unattractive. As a large proportion of facial imperfections and deformities are due to malposed teeth and jaws, to the dental profession is due the honor of almost everything that has been accomplished so far in facial orthopædia; and as the practice has been confined principally to the correction of irregularities of the teeth, it has given rise to that specialty of orthopædia known as orthodontia, which has been for years considered one of the proper branches of dentistry.

The term *orthodontia*, however, is not sufficient in itself, for its meaning is limited to irregularities of the teeth and their correction; whereas a movement of other parts quite as important in the reduction of certain facial deformities as the movement of teeth has long been recognized as within the possibilities of dental force appliances. And as this branch of the science is becoming more and more an important factor under the influence of modern methods, I would suggest as a more comprehensive and applicable title the term *Dental Orthopædia*.

The force which has from time to time been applied for the movement of malposed teeth has often changed the shape and surface contour of the alveolus in which the roots of the moving teeth were embedded,—and this latter movement in many instances has doubtless aided materially in the æsthetic facial effect of the operation. This is especially true where the dental arch superior or inferior has been expanded; also in the reduction of an anterior

superior dental protrusion,—in the latter instance more particularly when occipital pressure has been used. In many instances the force of this movement being communicated to the more solid, though immature, structure of the maxillary and other bones, has doubtless exerted more or less influence in changing their general physical forms, with results that could not have been obtained by a movement of the teeth alone.

The change also which has been accomplished by permanently forcing the lower jaw to a more anterior or posterior position in its relations to the upper is quite remarkable, and important in facial orthopædia.

In this connection, I am pleased to call attention to a paper by Dr. Norman Kingsley, entitled "Adenoid Growths, Mouth-Breathing, and Thumb-Sucking in their Relations to Deformities of the Jaws and Irregular Teeth," read at the January, 1892, meeting of the First District Dental Society of this city, and published in several numbers of the *Dental Cosmos* of that year, in which the author has given us a number of beautiful illustrations of his undoubted skill in this branch of facial orthopædic science.

The limited area upon which force can be applied to a tooth compared to the portion covered by the gum and embedded in a bony socket has made it next to impossible, with all ordinary methods, to move the apex of the root in the direction of the applied force. Nor could this ever be accomplished with force applied in the ordinary way at one point upon the crown, however near the gum it be attached; for the fulcrum in that case would always be the opposing margin of the alveolar socket, with a tendency to move the point of the root in an opposite direction. But if the fulcrum be transferred from the margin of the alveolar socket to a point upon the tooth near the occluding portion of the crown, and the power applied at a point as far upon the root as the mechanical opportunities of the case will permit, the apparatus becomes a lever of the third kind, the power being directed to a movement of the entire root in the direction of the applied force.

This principle of force which, I believe, was first outlined by Dr. Farrar, of this city, for the lateral movement of the entire tooth, will be found of great advantage when applied to the anterior superior teeth for the reduction of those facial deformities that are due to an abnormal prominence or depression of that portion of the superior maxilla which supports the upper lip and lower portion of the nose. When force is directed in this way at right angles with the peripheral surface of the bone, and applied equally to a

number of teeth standing side by side with roots embedded deeply in the alveolus, surrounded and more or less firmly connected with the cortical portion of true bone, there is usually little or no apparent absorption of the sockets as ordinarily occurs in the movement of a single tooth, but the immediate surrounding bony structure is carried bodily with the roots.

At the meeting of the World's Columbian Dental Congress, I presented a paper which will be found in the published proceedings of that Society, entitled "Some Principles governing the Development of Facial Contours in the Practice of Orthodontia." This paper was illustrated with plaster models of six cases in practice, covering the various facial imperfections and deformities produced by a malposition of the teeth and jaws, with a detailed description of different methods of applying the reciprocating principle of force in the reduction or development of facial contours. The purpose of the paper, as there stated, was to show how, with our present possibilities in the construction of dental regulating appliances, this principle of force could be applied to the forward or backward movement of the roots of the anterior teeth; and to illustrate also the importance of this possibility, when it is observed in this operation that the bones of youth do not remain stationary, to be ploughed through by the roots in a process of retrogressive metamorphosis, but that a considerable portion of the bone in which the teeth are embedded is carried with the roots in proportion as they are changed in position, thus enabling one to regulate many imperfections of the face by changing the shape and surface contour of the frame which supports and gives character to the features, over all that portion which can be effected by a movement of the bones contiguous to the roots of the teeth.

I have brought for your examination the models of six cases which have not been published elsewhere. In two of these I have finished treatment, one is nearly finished, and the balance are in different stages of completion. I have selected these with a view of showing the typical character of irregularity which often comes under your observation, that is accompanied almost invariably by a facial defect that is caused by the malposition of the roots of the anterior teeth and the surrounding bony structure, upon which important features of the face depend for their character. I have also brought the models of two cases that were exhibited at the Dental Congress, thinking you may not have had an opportunity there, in the rush of other things of importance, to personally or carefully examine them.

I wish to call your attention, right here, to the discussion which followed the reading of my paper at the Congress, in which a number of prominent dentists who, having seen a number of the patients whose models were there exhibited, kindly stated that the models did not do justice to the improvement I had accomplished. It is true that these models, which are made from exact plaster impressions of faces more or less deformed, do not fully express imperfections that would be markedly apparent by a personal observation of the face itself. The same is true of photographs which express but one, and usually the best, of many facial attitudes. And, on the other hand, while these imperfections are not usually so noticeable to friends and relatives, the slightest improvement towards beautifying the face by a removal of those unpleasant aspects, so apparent to strangers, is quickly noticed and even exaggerated by all who have had an opportunity to observe the various expressions of the face before and after treatment.

Before pointing out certain features of each particular case which I wish you to observe in your examination of the models, I will first explain in an informal talk the most recent method I have adopted in the construction and application of the dental contouring apparatus. In viewing this apparatus for the first time in the mouth or elsewhere, the first thought is in regard to its extent, apparent complication, and the difficulties in its construction and practical application; and the second is in regard to the pain and annoyance it must cause to the patient.

Of the latter, I wish to say, I have at present eleven patients, each wearing an apparatus of this character. All, except one, are attending school without the slightest interference or interruption of their school or other requirements, nor special inconvenience or irritation of the gums and mucous membrane. One of these patients, as Dr. George Cushing will tell you, is a boy of an exceedingly nervous temperament, having been affected for years with a mild type of chorea or St. Vitus's Dance, from which he has not fully recovered. When I commenced treatment this was one of the most pronounced cases of inlocked superior incisors I have seen with marked facial imperfection, characterized, as is common in these cases, with a decided depression of the middle features of the face, prominent lower lip, and apparent protrusion of the chin. (See Case III.) Having been reared with all the gentle care and luxury which wealth can give, and also because of his infirmity, it was eminently desirable to avoid any continued disturbance to his nervous system. He has now worn the apparatus over three months

and will soon be ready for the staying bands, with a result that will be exceedingly satisfactory. During this time he has not lost over three or four days of school, which is usually not necessary, and with no apparent increase of his nervous disorder.

In the construction and application of the contouring apparatus, I experienced many discouraging difficulties in my early attempts, notwithstanding the fact that in my first case I succeeded in reducing the most pronounced deformity of the face I have yet treated. (See letter from the father of this patient, published in proceedings of the World's Columbian Dental Congress, pp. 734, 735.) Now, all my former difficulties are reduced to a minimum, and the whole operation to a system that as nearly approaches an exact science as any other operation in dentistry.

The first case I wish to call your attention to comes under that class of facial deformities I have described elsewhere as a protrusion of the upper lip, at that point where it merges into the nasal septum and orifices, due to a malposition of the roots alone of the incisor teeth. This position of the roots of the superior incisors, with entire obliteration of the incisive fossæ, is not uncommon, even when the occluding ends of the teeth are in proper position, and often with the production of quite a marked facial deformity.

CASE I.—Miss R., aged twenty-two, commenced treatment December 17, 1893; staying bands October 3, 1894. The unusual time required for this operation was due to the age of the patient, and consequent impossibility of effecting a more rapid movement of the teeth. It will be observed by an examination of the models that the first superior bicuspid were removed and the space subsequently closed,—not so much by a backward movement of the crowns of the anterior teeth as by a forward movement of the molars, due to the great anchorage force they were obliged to sustain. It will also be observed by a careful examination that the cervical portion of the incisors have not materially changed their relative position, though the apices of their roots must have moved back at least three-eighths of an inch, judging from the present inclination of these teeth and the marked depression of the covering tissues, as compared to the first models.

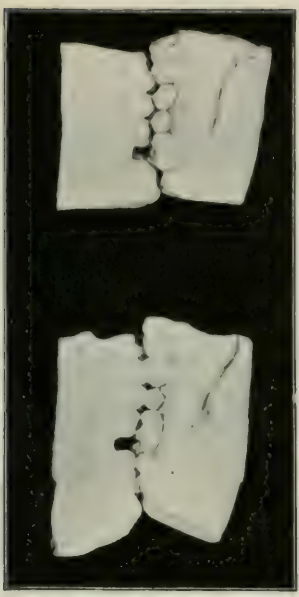
The cuspids did not originally stand at the same inclination as the incisors, nevertheless it will be observed that the roots of these teeth, which always offer the greatest resistance, have moved appreciably. What to me is more to the point and of infinite importance, compared to the correction of the dental irregularity, is the remarkably beautifying effect this slight change has produced on the face

of the patient, which, I must say, the models inadequately express. For further proof of this statement, I am pleased to be able to refer you to a man whom you all know, Dr. A. W. Harlan, who referred the case to me.

I have also here the models of another case to further illustrate this same type of deformity. (See Fig. 4.) I wish to say now in regard to this character of irregularity that experience has taught me that it is infinitely more difficult to move the roots and adjacent bone of the anterior superior teeth backward, especially that of the cuspid, than to move them forward, for reasons that are needless to explain. However, if the operation is performed as early in life as opportunities are afforded for attaching the appliances, and at a time when the superior maxillæ is more immature and cartilaginous, I believe that few difficulties will be experienced if the force is properly applied.

CASE II.—Miss M., aged sixteen; commenced treatment December 26, 1893; staying bands October 15, 1894. In this case the upper jaw was too small for the teeth, which were greatly crowded, and with the cuspids, as will be seen, in their customary positions under these conditions. The dental arch was lacking in its anterior extension rather than in width, the incisors being quite posteriorly placed as regards the other teeth, producing a marked depression of the upper lip that was decidedly inharmonious, to say the least. In preparing it for the application of the contouring apparatus, the crowns of the incisor teeth were first forced forward with jack-screws, and the cuspids crowded down more nearly into alignment. At this stage in the operation models of the case were exhibited at the Illinois State Dental Society, to show the common facial result of the ordinary method of correcting this character of irregularity. The crowns of the incisor teeth were pushed forward at a considerable angle, and all the teeth were crowded, with contracted interproximate spaces. The incisive fossæ seemed deeper than ever, while the facial imperfection was unimproved. The model which you will examine of the teeth at this stage of correction is mounted with the contouring apparatus in place, similar to the one which was at this time attached to the teeth of the patient. Now, mark the change which occurred after wearing this apparatus four months, as shown in the final model of the teeth. Notice the upright position of the incisor teeth and the ample room that has been obtained for all the teeth, and, moreover, this change has produced, as in other instances, a decidedly favorable improvement to the face.

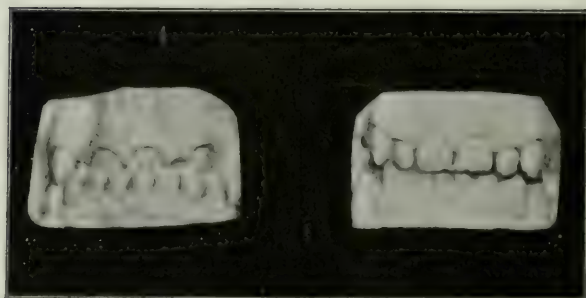
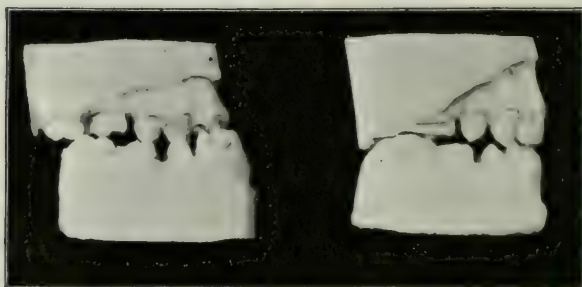
CASE I.



CASE II.



CASE III.



CASE III.—George T., aged fourteen, is the case from Dr. Cushing which I previously mentioned.¹

By examining the models of the teeth it will be found that the superior laterals were badly rotated because of insufficient room between the cuspids that were inlocked by the buccal cusps of the inferior bicuspids. Before it was possible, therefore, to attach the contouring apparatus it was necessary to widen the space for the incisors and rotate the laterals into proper alignment. This proved to be a most difficult and trying part of the operation on account of the peculiar occlusion of the teeth, it requiring something over a month before they were ready for the contouring apparatus, which was finally placed on the teeth December 24, 1894, and removed March 14, that I might take impressions for the purpose of showing you what had been accomplished in this case after wearing the contouring apparatus about two and a half months.

I mention this with no intention of leading you to infer that this is the ordinary time these cases require, but rather as an unusual result.

Time, in my estimation, is a factor of the least importance in all orthopædic operations; although there are many who make a specialty of this branch of dentistry who seem to think they will not be considered skilful unless they can manage to make you wonder how it is possible they can accomplish this or that in so short a time. The facts are, that the cases which have every appearance of being the easiest of their class often prove to be the most obdurate, and *vice versa*; so that no one or a half dozen cases can be cited as an example of skill or of time that others will require. That which is of the most vital importance should lie in the possibility of accomplishing the result you aim at without injury to the teeth or to the health of the patient. It is also important that the apparatus which you devise should be mechanically and orthopædically correct, in order that it does its work as rapidly as the requirements of nature will permit, and with the least possible amount of pain or inconvenience to the patient.

The balance of the models, or Cases IV., V., and VI., which I exhibit here for the first time, are not completed, therefore I will reserve their publication,—having brought them, as I said before, to

[¹ At the Tri-State Dental Meeting, at Detroit, Dr. Cushing, in speaking of this case, said, "These models do not begin to express the great change which has been accomplished in this and other cases I have seen which Dr. Case has treated."—Ed.]

more fully exemplify the peculiar character of certain common types of deformities which are amenable to treatment with more than pleasing results. I have, however, taken modelling compound impressions of the anterior aspect of some of these cases with the jaws closed and the apparatus in place. From the models of these you will be able to judge of the present advancement of the different operations.

If I succeed in convincing you that this peculiar character of deformity demands at your hands a course of treatment that is capable of restoring to the face its natural beauty, and that in the future nothing short of this will satisfy you, I shall go home from this meeting with the proud and satisfied feeling that I have not lived in vain.

SALOL.¹

BY R. M. SANGER, D.D.S., ORANGE, N. J.

MR. PRESIDENT AND GENTLEMEN,—If originality of thought or newness in treatment are prerequisites in writing a paper that shall be profitable, there can be no excuse for this paper. But if observation and experience have any value, I can reasonably expect to make the subject chosen one of interest to you.

In the *Dental Cosmos* for May, 1894, there appeared an able article by Dr. A. E. Mascott, of Paris, France, on "Salol in Root-Filling," which impressed me to such a degree that I at once began experimenting with this material. The result was most gratifying, and salol has become a valuable addition to my list of remedies.

Dr. Mascott describes the drug and its action as follows: "Salol is a compound in which one hydrogen atom of the salicylic acid has been replaced by the radical phenyl. To obtain it the perchloride of phosphorus or the oxychloride of carbon, or nascent chlorydric acid, is made to act on a mixture of salicylate and phenate of sodium. It is also obtained by another method. At 120° C. the oxychloride of phosphorus is made to act on a mixture of salicylic acid and phenol, producing the salicylate of phenyl, or salol. Thus obtained, it is in the form of a white, crystalline powder, insoluble in water and glycerin, but readily soluble in ether, alcohol, chloroform, benzine, spirit of turpentine, copal balsam.

¹ Read before the Odontological Society of Pennsylvania, February 9, 1895.

liquid vaseline, fixed and volatile oils. It has a fragrant taste, and smells similar to the essence of winter-green. At 40° C. it completely fuses into a liquid. When the temperature is raised to or near its boiling-point, it retains the liquid state after the temperature has again fallen below its melting-point. Even at the ordinary temperature of the office-rooms it will remain fluid from fifteen to twenty minutes; but if fused at the lowest possible heat it then returns in a few minutes to the solid state. This substance has also the peculiar property of forming intimate mixtures with iodoform, aristol, and camphor. Melted together, salol and aristol, salol and iodoform, become liquid like salol alone, which form in a few minutes a solid mass, not a new chemical product, but a mixture of two substances, having each one of them all of its characteristic properties, excepting the new form of crystallization. Salol was proposed by Professor Nencki as a substitute for salicylate of sodium. Its general use is that of an antiseptic."

As a root-filler, salol is manipulated in this manner: Having the rubber dam adjusted, the cavity dry, and the canals sterilized by any of the various methods at our command, the root is thoroughly dried with an Evans root-drier, and the salol crystal placed in the cavity with a flat spatula or an amalgam carrier. The hot root-drier is then passed through the powder, which immediately melts and follows the instrument into the canal, following by capillary attraction beyond the point where the instrument stops. Repeating this once or twice, the canal will be entirely filled with the liquid salol. A warm tin or copper canal-point is then introduced, and carried carefully as far into the canal as possible without passing through the apex. It is then left for a few moments to cool, when the canal-point will be found to be solidly embedded in a crystalline, antiseptic mass which entirely fills the canal. If the cavity is so situated that the crystals cannot be readily placed in position, the salol is first melted in a test-tube, care being taken not to heat it more than just enough to liquefy the powder. Then by the use of a glass syringe, slightly warmed, the salol is placed in the cavity, and carried to the end of the canal by the use of the root-drier as before.

I have yet to record a single failure from this use of this material, and I believe it to be as near the ideal root-filling as anything yet offered to the profession.

If from any cause we should desire to remove the filling, a warm instrument held against the metal point will quickly heat it through, causing the salol to melt, and the whole can be readily

washed out of the cavity with alcohol without any undue pressure or irritation to the sore tooth.

Just a word here regarding these little glass syringes. They are made of blown glass, and may be heated over an alcohol or Bunsen flame, and the point bent to any desired shape without fear of breaking if care be used when the heat is first applied. They are very cheap, costing about one dollar per dozen, and will be found extremely useful where a syringe is needed.

We frequently have cases presented where the teeth have decayed to such an extent that to remove all the infected tissue would expose the pulp, and to leave it would almost certainly insure exposure and trouble from recurrent decay unless thorough sterilization can be secured and maintained. Let us suppose the case of an inferior first permanent molar. Having adjusted the dam, dried the cavity, and removed as much of the infected material as the condition will admit, sterilizing the remainder as thoroughly as possible, by the use of whatever non-irritating germicide the operator may prefer, the cavity is then thoroughly dried, and the crystals of salol placed in with a flat spatula, and melted by passing over it a smooth, flat burnisher or amalgam plugger warmed sufficiently to liquefy the salol without causing pain to the patient. The less heat used the more quickly crystallization takes place again, which should occur in three or four minutes at the longest. We have now sealed the floor of the cavity with a firm mass of antiseptic material capable of receiving considerable pressure without inconvenience to the patient. This is far from being a non-conductor, however, and should be covered with a layer of cement before the final filling is inserted.

In treating an upper tooth under similar circumstances the only difference would be in the manner of introducing the salol. Here we take a piece of asbestos felt, cut to fit the floor of the cavity, warm it over a spirit lamp, and place it against the salol crystals, which have been placed on a glass slab for that purpose. Immediately the salol is melted and taken up by the asbestos, until it is more than saturated. It is then placed in the cavity, and, upon cooling, we proceed as before, not forgetting the cement, however, as the asbestos thus treated does not give a non-conducting surface.

Where the pulp is actually exposed, and we desire to cap it, remove as much decay as possible around the edge of the exposure, and saturate the floor of the cavity with oil of cloves or cinnamon to relieve the pain, if any be present, and sterilize the cavity. A small disk of platinum, about 32 gauge, is then cut to fit the floor

of the cavity, and the centre depressed with a ball burnisher, thus forming a metal cup. A paste is made of carbolic acid, oxide of zinc, and vaseline, with which the cup is filled, and placed gently over the exposed pulp. The crystals of salol are then placed over the cap and liquefied by passing over them a warm, flat burnisher. In a few moments the cap and floor of the cavity are hermetically sealed, and the tooth is ready for filling.

Salol is readily dissolved by any of the volatile oils or alcohol. All surplus should be carefully removed from around the edges of the cavity and the outside of the tooth, as it is irritating to the mucous membrane, and will make an abrasion somewhat resembling a canker if left in contact with the gum. This sore is not dangerous, however, and will heal in a day or two, the healing being hastened by the application of vaseline.

IMPACTED THIRD MOLARS.

BY DR. J. W. FOREMAN, ASHEVILLE, N. C.

THE text-books are still teaching the extraction of the second molars for the relief of trouble caused by the lack of room for the proper eruption of the third molar, especially when it partially erupts in a horizontal position.

The last (sixth) edition of Garretson's "Oral Surgery," 1894, says, in discussing this condition, "Such extraction [of the third molar], however, is occasionally among the almost impossible things. A tooth so affected will not infrequently have but a point not larger than the head of a pin erupted. In these cases the best thing to be done is to *take out the adjoining molar.*" (See p. 852.)

I have never seen a case where this was either necessary or justifiable. It is not necessary because, if the third molar is through the gum at all, with proper appliances it can be brought far enough up to be grasped with the forceps and removed. It is not justifiable because in the vast majority of instances we deprive the patient of a very valuable tooth, the extraction of which is in no degree necessary; and, as a rule, the third molar proves of but little value, tipping forward if not erupted in a horizontal position, thus producing a practical loss of two teeth instead of one.

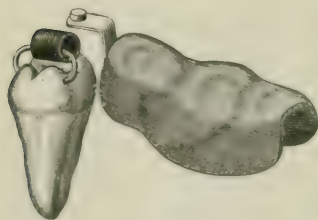
From my observation and experience I can conceive of no case, where the tooth is through the gum at all, or even above the edge

of its socket, in which it would be anything but *bad* practice to extract the second molar, except where inflammation is so great that it would be dangerous to delay extraction long enough to bring the offending tooth up within the grasp of the forceps, or the possible case where there might not be strength enough in the tooth to resist the force necessary to dislodge it. Even where the inflammation is severe it will subside quickly, as a rule, after the appliance for elevating the tooth is in place, as this at once prevents the bruising and irritating of the overlying soft parts, which causes the trouble. When the tooth is far enough erupted to allow a firm hold with the forceps there is seldom need for anything more than to grind or file away the tooth sufficiently to free it from contact with the second molar, or to separate them as for filling, that the tooth may be drawn away from the ramus. Should the tooth present horizontally, or be so imperfectly erupted as to be beyond the reach of the forceps, an apparatus to elevate it is needed.

The appliance used in dealing with the last case is shown in Fig. 2. It is a vulcanite cap to cover the two molars and second

FIG. 1.

FIG. 2.



bicuspid, with a gold arm bent so as to project over the tooth to be lifted, and as far above it as the upper jaw will permit. The remainder of the apparatus consisted of a gold-wire staple with the ends bent the second time so as to form an enclosed, long link, the ends of which were pinched together into holes drilled in the buccal and lingual sides of the

tooth, and a piece of rubber tubing to connect this staple with the projecting arm of the cap.

The idea was first to get the force from a screw, but it was found that the patient could not manage that, and the elastic was substituted. The cap was removed, cleaned, and replaced once a day by the patient.

This tooth was placed horizontally, the grinding surface impinging upon the distal root of the second molar; the distal surface, the only part uncovered, less than one-fourth of the circumference of the tooth. The gum had to be cut away on both sides to get low enough down to drill the holes, the discolored part between the holes being all that was exposed. Fig. 1 shows tooth, staple, and elastic.

Ten days sufficed to lift the tooth enough to permit fairly easy

extraction. A severe otalgia, from which the patient had suffered for weeks, disappeared almost as soon as the tooth began to move, and, with the exception of a slight attack the day after extraction, has never returned.

The difficulties in extracting these teeth are often very great, it is true, but it has never been my misfortune to find them so great as to force me to sacrifice the second molar.

THE RATIONAL THERAPEUTICS OF PYORRHŒA ALVEOLARIS.

BY HENRY H. BURCHARD, M.D., D.D.S., PHILADELPHIA.

IN no other instance, except it may be the vomiting of pregnancy, is the truth of the maxim—"in a multitude of remedies there is no remedy"—better illustrated than in the therapeutics of the condition known as pyorrhœa alveolaris. There are but few drugs of the classes of escharotics, antiseptics, and astringents which have not been applied. Each one has had its advocates, subscribers to its efficiency; and just as great a number have declared the same agent worthless. Many of the drugs have been described as almost specific in their action. Undoubtedly a specific is what is wanted, but the first step in finding a specific remedy is to ascertain that the disease itself is specific.

As pyorrhœa is demonstrably significant of, it may be, a dozen or more disease conditions, one specific will scarcely cover the field for all.

In any disease the problem confronting a therapist is a dual one: removing cause and remedying effect. It by no means follows that the removal of a cause is followed by the disappearance of all effects. The phenomena represented by this secondary element may be the important ones.

Nearly all critics of the literature of this subject comment upon the lack of rationality evinced in the therapeutics of the disorder.

There is no reason why this dental condition should be placed beyond kinship with all other diseased states. Commonly it is viewed as being in dental disorders what carcinoma is in surgical or tuberculosis in medical. The classification is unwarranted. The use of the term, applied as it is, is most irrational; it is merely the

description of a symptom, not of a disease. To say that a patient has pyorrhœa alveolaris is less definite than to say he or she has an ulcer; for the latter is something tangible, the former but a statement that a patient has pus oozing from a tooth socket.

Dr. M. L. Rhein has presented in the *Dental Cosmos* a list of disease conditions, in all of which this symptom may form an attendant.

In the matter of nomenclature, for the virulent variety Dr. G. V. Black has given us one of the most descriptive and happily applicable terms in that of phagedenic pericementitis. This is frequently applied as a synonym of pyorrhœa alveolaris, a contradiction of Dr. Black's written description. As he describes phagedenic pericementitis, it is a disease process, distinct in itself, of which pyorrhœa is but one symptom, and may not be even that. The present writer maintains that this title, given by Dr. Black, is one of the best in all dental nomenclature, and should be retained until such time as it may be fitly superseded by an absolute title found upon the undisputed cause of the disease states.

The name pyorrhœa alveolaris is deliberately chosen as a heading to this essay, so that phagedenic pericementitis may be included.

As before stated, the therapeutic problem confronting us is that of the removal of causes and the cure of effects.

Irrespective of the predisposing causes and those exciting causes which gave origin to the present diseased condition, the disorder known as pyorrhœa has resulting from or accompanying it a tolerably distinct set of surgical conditions to be overcome. As a rule they are as follows: Detachment of the gum from the cervices of the teeth; the gums themselves have any stage of localized inflammation, usually a tumefaction; a chronic congestion; pockets are formed between the teeth and gums, and in the pockets are firmly adherent deposits; an increasing loss of pericementum, and it may be of cementum also, with a molecular destruction of the alveolar walls. In consequence of this progressive loss of retentive apparatus the teeth loosen and the looseness is increased by the strain of mastication, which tends to force the organs from their scant support. The same force, by increasing the arc of movement at the apex of the root, may cause amputation of the vascular and neural supply to the pulp.

Many of these teeth which are the victims of persistent pyorrhœa have the continuation of the pus formation due to the presence of the dead and decomposing pulp, which has become the breeding-ground of micro-organisms. So it may be well to mention here that the opening and thorough sterilizing of the pulp-

chamber may be required as one therapeutic step. Such a procedure has determined a cure in some instances.

It will be seen there is a set of conditions; each one is a definite indication for treatment. Rational therapeutics demands that each item shall receive intelligently-directed consideration.

The ultimate object being the healthy retention of the teeth, the elements which threaten their retention should be eliminated in the order of their immediate power. Undue strain from mastication is the first factor, so that faults of occlusion should be first corrected. This is accomplished through a judicious trimming of the teeth. As this operation might, in itself, represent sufficient force to dislodge the teeth, while the grinding is being done, a temporary splint should be applied,—ligatures suffice for this purpose.

The teeth are now in the condition of subluxation. A fixed splint is therefore required to keep them at surgical rest. The operator's ingenuity will suggest an applicable form for this,—rings, ligatures, plate, or some one, or a modification, of Dr. Jackson's devices.

The writer uses more often than any other means a thin plate of swaged metal, fitted to the teeth, and several adjoining ones, and cemented with oxyphosphate of zinc.

One surgical indication has been met. The greatest source of irritation remaining is foreign bodies; these being represented by the calcic deposits. The greater (at least the grosser) part of these is removed while the temporary splint is in use. *It is absolutely essential that the last vestige of these deposits be removed to furnish reasonable hope of cure.*

General experience indicates that solvents must play a secondary part to instrumental means for the attainment of the object sought. In this connection, trichloroacetic acid will check oozing and permit a better view of the pockets, and to some extent soften the deposits. Aromatic sulphuric acid destroys carious bone, serves as a stimulant and antiseptic, but as a solvent of calculi it plays a small part. These two strong acid applications are mentioned to emphasize the importance of thorough instrumentation for the desired end.

Presuming now the immobility of the teeth secured, and this with a normal articulation less the thickness of the splint, every particle of foreign material removed from the roots, and there still remain morbid conditions. (It may be observed, parenthetically, that in some cases these deposits are so strongly adherent as to require the use of a file for their removal, even after extraction.) The

cementum of the tooth or teeth deprived, it may be, of a great extent of its nutrient membrane, a loss of bony walls of support, and the tissues about in a state of subacute inflammation. Blind pockets present, containing pus, organisms, and broken down tissue, and open to the access of pathogenic material.

The organisms must be first destroyed and the dead tissues removed. Considering the tortuosity of the recesses to be acted upon, it is evident that strong solutions of hydrogen peroxide are the indication. The open pockets are now the menace, as they permit the access of micro-organisms, so the indication is their closure, the evident need being an annular elastic bandage. In addition to this the destruction of fresh crops of micro-organisms must be assured. A mechanical splint for the purpose named being impracticable, its substitute is found in astringents, which, by causing the tissues to contract, form the soft parts themselves into a bandage. The continued use of an antiseptic is essential.

For the combined purpose of astringent and antiseptic ablutions zinc chloride meets the need. As the nutritive change to be induced is a constructive, not a destructive one, this solution should be in strength fit as a stimulant, not a caustic, say one or two per cent. Its action is, however, inferior to zinc iodide as regards special stimulation.

Other surgical means for the induction of tissue growth in addition to stimulants, such as sponge grafts, offer but a faint hope, owing to the difficulties of perfect sterilization and the debasement of the tissues. The disease arrested, and whatever loss of alveolar process there may be is a permanent loss.

The possibilities of judicious replantation in selected cases are left for experimentation.

Single remedies of classes have been selected here for prescription, with a distinct purpose.

As far as local therapeutics is concerned, this is a statement of conditions and requirements, and it is more rational to use the means at our disposal (with discretion) than it is to multiply remedies, most of which are at present of doubtful value. The drugs now in use meet the needs as these needs are understood, so that labor in the lengthening of drug lists is poorly directed.

Our therapeutic sources are fully abreast or are in advance of our knowledge of the etiology and pathology involved in pyorrhœa; and if there is a general failure of therapeutic application, it is probably because there are disease elements of which we have not full cognizance, or that we have not removed all causes known.

It is conceded that some forms of pyorrhœa are of purely local significance; and these are undoubtedly curable and cured by local therapeutics of the type mentioned above. Failure in these cases is due to incompleteness in some step of the therapeutics, usually in the removal of deposits.

It is generally accepted that some forms of pyorrhœa have a constitutional significance. Some constitutional state acting as a predisposing and, it may be, existing cause; producing a condition either identical with, similar to, or differing in some particulars from the one described.

Evidently in these cases to effect a cure requires the correction of the constitutional cause, if it still be active. This proviso is made, because a constitutional cause may have passed over the anatomical part involved like a wave, and then the only evidence remaining of its action is the local disease. Cure is delayed, is hopeless so long as the general condition persists. Even if cured, the local trouble may return with any recurrence of the constitutional malady.

Any cause or causes known to give origin to this local condition must be eliminated in the order of their probability. As to the catarrhal aspect, a proper inquiry is, What is the cause of the catarrh? This itself may be the result of gout, a common cause of pericemental degeneration. Whatever the cause, it is certain that pyorrhœa, as any other condition, is curable only by removal of the cause and remedying the effects. This applies no matter what the cause. When we discover these, our therapeutic resources will no doubt be found sufficient, and the formidable drug lists will be relegated to their proper place,—“innocuous desuetude.”

Personally I am of the opinion that next to incomplete removal of deposits as the greatest cause of failure in therapeutics is a lack of care in determining for each case the individual elements which are involved in the etiology, for, as to this matter, cases vary, and vary greatly.

I have seen so many cases of tooth-loss, attended by pyorrhœa alveolaris, due, and due alone, to malocclusion, that I am prompted to add this as causative of a distinct class. Incidental to this, this loss through malocclusion occurs in the plethoric as commonly as in the anæmic patient.

The local causes are quite sufficient to explain the disorder, and it rapidly subsides with the correction of the false occlusion. They in no way resemble the gouty cases, except, perhaps, in a common symptom,—pyorrhœa.

DENTISTRY IN THE PUBLIC SCHOOLS.¹

BY E. PROCTOR HOLMES, D.M.D., STOUGHTON, MASS.

MR. PRESIDENT AND GENTLEMEN,—I speak on a subject which, though important, and, I trust, worth your attention, does not pertain to anything of a scientific nature.

Nothing adds more to one's personal appearance than a well-cared-for set of natural teeth. On the other hand, nothing detracts more from a face that nature meant to be comely than decayed, unclean teeth.

We often meet people who, conscious of some glaring defect in their dental organization, never address us without putting the hand to the mouth or contracting the orbicularis oris in the attempt to make the deficiency less apparent.

It is necessary for the moral well-being of a community that its people should be taught to care for and to preserve their teeth. Teach a boy to care for his teeth; instil into his mind the fact that this is necessary for his present and future welfare; keep him at it until what he calls a task becomes a pleasure and a habit, and you have started him well on the road to cleanliness, which leads to godliness.

A boy who cleans his teeth regularly will as regularly wash his face and comb his hair. He will try to be neat in his dress, and this will lead to greater self-respect.

Perhaps some one will say, "The place to teach this is at home."

Yes, this is true; but a little extra teaching on this subject at the public schools will emphasize the home training.

A short time since one of my patients said to me,—

"Dr. Holmes, I must tell you. Harold came home from school the other day, and said to me, 'Oh, mother! what do you think? Teacher says we must brush our teeth every day.' 'Good,' said I; 'now see that you do so.' The next day he came running in, and said, 'Teacher says we must brush our teeth *twice* a day.' 'That's better still,' I replied; 'and when your teacher tells you to brush your teeth *three* times a day I shall say that that is even better,' for," said my patient to me, "you know, doctor, that I try to have Harold take care of his teeth, and I tell him over and over again that he must brush them every day, and two or three times a day,

¹ Read before the Harvard Odontological Society, January 31, 1895.

and still he forgets; but when his *teacher* tells him to brush his teeth, why, he thinks he *must* then; and I'm so glad the teacher has taken this step."

It is an acknowledged and a deplorable fact that the general public is not educated up to a proper appreciation of dental science, and we often hear it said that the dentist must be the educator,—must gradually elevate his patients to his own level,—and that as the standard of dentistry is raised, in the same ratio will the people rise to an intelligent appreciation of their teeth and of the dentist who cares for them.

There may be here and there a dentist whose patients, as a whole, are so intelligent that he has never felt the need of any special education among the people regarding the care and proper treatment of the teeth, but among the common people there is a woful ignorance regarding the teeth and their importance, and that even among the more intelligent and well-educated people there is a degree of ignorance displayed utterly at variance with their intelligent appreciation of other subjects.

As a lack of knowledge relative to the teeth and their preservation is confined to no particular class of people, how could we better disseminate this knowledge than through the far-reaching influence of the public schools? and as the number of pupils who attend the public schools is larger in the primary department, growing smaller with each succeeding year, in order to do the greatest good to the greatest number this education should begin very early in life, with the idea of making it quite complete by the time the pupil is ready to graduate from the grammar-school, for two reasons: first, a great percentage of the students complete their education with the grammar-school; and, second, in a great many places physiology, or any subject relating thereto, is not taught in the high schools.

I have frequently asked some of my young patients who were attending the high school what they had learned or were learning there about their teeth, and invariably the answer would be, "Oh, not much."

"What?" I would ask, "does not your physiology contain anything relating to the teeth and the care of them?"

"Oh, we studied physiology at the grammar-school, and I've forgotten what little I ever learned about the teeth."

I have but one patient from the high school who, in speaking of her teeth, designates them by name.

A month or so ago I had for a patient a bright young lady teacher from the primary department of one of our public schools.

Before I had completed her work I found that she hardly knew one tooth from another by name, and was quite surprised when, in answer to my query if she taught her scholars anything pertaining to their teeth, she replied, "Oh, yes, doctor; there is something about the care of the teeth in the 'Child's Health Primer,' although it doesn't have *much* to say on the subject,—it treats mostly on the injurious effects of alcoholic drinks and tobacco; but," she added, "I often tell my scholars that they must brush their teeth every day with salt and water."

I have examined the text-books on physiology used in the schools of one of the representative towns not far from this city, and I can truly say that I am not surprised that the majority of those who graduate from our common schools know little or nothing in regard to their teeth.

The "Child's Health Primer," for primary classes, contains one or two illustrations of the teeth, and about a page and a half of useful information. During the eighth year the text-book in hygienic physiology is begun, and is completed during the ninth year. This text-book of hygienic physiology was written by D. F. Lincoln, M.D., who says, "Nearly the whole of this work has been examined by the following gentlemen: Henry P. Walcut, M.D., James J. Putnam, M.D., Thomas Dwight, M.D.," and others. Suffice it to say that it is a pity that these M.D.'s did not examine the work a little more carefully, or that the part of it relating to the teeth was not examined by a D.M.D. or D.D.S.

The book contains about four pages of descriptive matter, and the synopsis covers about one page, relating to the teeth. There are six illustrations, embracing a cut showing the permanent and the temporary teeth in their relative positions, a vertical section of a bicuspid, and the lower jaw in four stages of its existence.

On page 168 is the following statement: "Children get their first set of teeth (the milk teeth) at various periods, beginning from the fourth to the sixth month of life. This set comprises twenty teeth,—viz., eight incisors or cutting teeth, four canines or eye teeth, and eight bicuspid or grinders, with two roots." In the synopsis reference is again made to the "eight bicuspid in the first set." From page 170, same book, I quote the following: "The enamel gets worn off from the crown of the tooth at the top generally by the twentieth or thirtieth year of age."

Now, while I admit that it may make no great difference to the child if he be taught to call his eight temporary molars bicuspid, and that the result may be the same whether he does or does not

expect the enamel to be worn from the "top" of the crowns of his teeth some time between his twentieth and thirtieth years, I *do* claim that the possibility of such misstatements existing in a work of this kind shows with what little importance this branch of physiology—or, more properly speaking, dental anatomy—is regarded.

Let us suppose for a moment that this same book of hygienic physiology contained the statement that the radius and ulnar were two bones of the leg, and that their styloid processes were worn off sometimes between the twentieth and thirtieth years, can we not, those of us who were so fortunate as to receive our instruction in anatomy from Thomas Dwight, M.D., seem to see that gentleman raising his hands in holy horror at the possibility of such an error existing in print, while the eight temporary bicuspids and the enamelless "tops" of the teeth are allowed to pass unchallenged. Yet this, from a dentist's stand-point, is an inexcusable error.

How does our government look at this matter? Does it have any requirements, so far as the teeth are concerned, that must be met by its servants?

To those occupying civil positions it has nothing to say. They may be the happy possessors of their natural teeth, glory in the never-aching qualities of an artificial denture, or have no teeth at all,—it is all the same to "Uncle Sam."

But there are those of its servants who, at the time that they become such, must have teeth that reach a certain, though not very clearly defined, standard of excellence. I refer to the officers and enlisted men of our army.

No matter what stage of physical development a man has reached; no matter what his general qualifications may be; unless his *teeth* are up to a certain standard he cannot enter West Point as a student, nor can he enlist in the regular army.

I think the greater number present will agree that this is as it should be,—that the requirements are not too exacting; but I submit to you, is it right, is it consistent, for our government to demand that a man entering its service as a soldier should have teeth in a fair condition, when, up to the hour of his enlistment, he may have heard not one word relating to the care and importance of those organs which have now become so necessary to his well-being?

Gentlemen, as dentists we have rights which our government is bound to respect.

Of the government that demands that we shall pass an examination before its chosen representatives in order that we may serve its people, we have a right to assert that it shall teach its people

how to care for their teeth, and the importance of them, so that they may be able to appreciate in some degree the patience, skill, and faithful service of the dentist.

A CONSIDERATION OF SOME PROBLEMS IN A DENTIST'S LIFE.¹

BY EZRA F. TAFT, D.M.D., CAMBRIDGE, MASS.

A STUDENT once put the question to me, "Do you, after many years of practice, feel that you are still learning by experience something new to help you in receiving patients: reading their whims, disposition, and character, and trying to make such an impression upon them as shall harmonize the interests of both?"

Like the parson who preached a sermon on the devil, and gave an exhaustive view of his text because he was full of it, so I am prepared to speak exhaustively, if not exhaustingly, upon a subject in which I am so much interested. I once knew of a professional man who aimed to make his life an easy one. In his daily routine of dental practice his time was fully occupied when in his office, though his hours were so limited that at the close of the day he did not feel he had been physically or mentally pressed beyond his limit.

Ill health caused a dentist occupying apartments with him to retire from business and offer his practice for sale. The temptation was too great. My friend saw here an opening which promised good results, and undertook what was really the work of two men, hardly realizing what new cares and responsibilities he was assuming. Then with his old friends still seeking him, and the crowding in of patients from his new field, he soon found it was one thing to have a large practice and another to be able so to regulate it as to feel that he was not physically or mentally pressed beyond the proper limit. The case of this man working harder than he ought is common to the profession generally. In other words, our practice dominates our lives rather than that we regulate and control our practice in such a way that our health does not suffer, and that we leave ourselves time for recreation. I shall consider this question first from the stand-point of the patient, and then from that of

¹ Read before the Harvard Odontological Society, September 27, 1894.

the practitioner. It is impossible to classify our patients except in a general way. The varieties are as infinite as the characteristics of the human family.

We stand at the door of some practitioner and interview the different ones as they enter the reception-room. Our purpose is to make a study of them, learning, if possible, in what mood they have come there, and asking point-blank why they have been led to make this call upon their dentist.

We see at once that education has had its influence. It makes no difference whether it is a practitioner in an exclusive locality in one of our large cities, or in a wooden business block of a back country town. If he is a dentist taking such a stand as will do honor to his profession, his callers will be the rich and the poor, the educated and the ignorant, those who appreciate good work, and those who are so distrustful as to ask many questions before even telling why they have called. They are callers, but not all patients. If a man's time is fully occupied he will naturally work for those patients who most appreciate his work, and are willing to pay what it is worth. Fortunate is he if he can employ some assistant to relieve him of multitudinous cares, and especially to see all visitors. The average practitioner has no such assistant, perhaps not even a servant to answer the bell and show the patient in.

An early appointment to accommodate some one who is going away finds your first patient a little late on account of early household duties. You begin your work for her, however, when some one steps in just for a moment to speak of one of the many hundred things that seems little to the patient, but which is a certain amount of hinderance to the practitioner.

Next, a gentleman calls on the way to his business to make an appointment for his wife. A lady has entered; the rustling of paper in her hand gives you encouragement that a bill is to be paid, and you gladly step in to see her. Your surmise is correct, but before handing you the money she begs you to look at your books to make sure there was not a mistake in the number of fillings indicated in the bill. She is sorry to detain you, but it will take only a minute, and she will be better satisfied.

A nervous, fidgety woman steps in next, to say, with a voice heard almost in the street, that she had not worn that under set of teeth hardly an hour since they were put in. They would not stay in place, and her mouth was too sore for anything.

A little girl runs in to tell you that her mother was obliged to go away and couldn't keep her appointment the next day, and, after

taking several minutes in studying the appointment-book, another time is set. A self-important young man, in joyous costume of latest cut, holding a lighted cigarette between his fingers, would like to know if you had any leisure time this morning, as his wisdom-tooth was giving him a great deal of trouble.

If you are in full practice it is a great help to you, and is money well expended, to have some kind of assistant; yet even then it is often necessary for the dentist himself to see the caller. Many reserve certain parts of the day for consultation, examination, etc.; yet I do not believe it is possible to carry out that plan, as but few patients would learn of that rule, and when known it would be almost impossible to confine themselves to certain hours. You are in a profession depending upon the public for your practice, and to the public you must cater. If your time is fully occupied, you would be glad to put up a sign on your door as to whom you would like for patrons; but that also is impossible. Your callers are from all classes. You must be, at least, civil to every one. Fortunate is that man whose practice is not a local one, but whose patients seek him from miles around, and who makes many of his appointments through the mail. We speak of a man who, through good work and a good name, has secured a large practice, and has the most of his regular office hours filled with appointments for at least two or three weeks in advance.

The dentist who is in full practice can have no respite during the working hours of the day, and it is not simply mechanical labor, but a continuous effort of the mental and physical powers of the operator. He will work for one patient only a short time, whose nervous organization is such as to try the most patient man. He will work for another a full half day and, on account of the equanimity and serenity of this person, will be but very little tired, and fully equal to the work required of him the rest of the day. Standing, as many do, from eight or nine in the morning till five in the afternoon, with one or at most two hours' intermission at noon, and not only this, but meeting and working for all classes and conditions of men: children, whose eyes and actions show an uncontrollable fear; women, whose nervousness stands out in their very voice; men, whose time is so valuable that their impatience is almost unendurable. Under these varied circumstances what is to be expected? There may be a constitution now and then made of iron; there may be a nervous organization so wiry that no amount of twisting and pulling can harm it; there may be one occasionally who has the happy faculty of so directing his work that it leaves

no bad results; but the average man cannot do this. With his time all occupied he finds himself at the close of the day a mental and physical sufferer. Let this be kept up and the overstrained nerves will finally yield. Physically, there are few professions calling for such constant strain on one's system. The enforced and unnatural position which must be sustained for so long a time will introduce us to the pangs of rheumatism, lumbago, and kindred ills. The strain on the eyes, which is so constant, brings on a series of head troubles, from which very few of us are free. All this means that the average practitioner is doing more than he is able, and does not know any method of lightening his labors and still hold the practice he desires to have. It means that he is not master of his own time, but a slave to his patients and friends. You, gentlemen, know that I am stating no exaggerated case, however it seems to those out of the profession.

Three brothers were comparing notes on their different occupations,—the one a bank-teller, the second a physician, the third a dentist,—each claiming his life was a struggle, and more undesirable than the others.

The teller, especially, laid stress on the fact that his time was not his own; that his hours were defined, his work was to be done every day, with no cessation. Whatever his physical feelings, or his longing for a little outing, he was under the control of a higher power that said "No."

The physician felt he was a burdened man. To be sure he was his own master; but his life work was to battle with disease, and as he had the care of the health of different families, he had great responsibility; he must be ready to go night or day, and have but very little leisure or time that he could calculate on as being his own.

The dentist's life was looked upon by the other two as most attractive by comparison: perfect control of his time by appointment, making his day as long as he saw fit, drawing such a line among patients as to exclude those who were undesirable, and, finally, so remunerative,—large fees with but very little expense.

Doubtless this is the way our profession is regarded by many who look only upon the surface, but the busy dentist could quickly convince them of their mistake, and prove to them that his calling ranks among the most wearing of occupations, physically and mentally, made so in part by petty annoyances to which I have before alluded. If, then, the daily routine of our professional life is such that not only is our time taken up with regular appointments, but

we are usually overcrowded by reason of the many interruptions which must come in every man's practice, we must conclude that we are bowing ourselves too much to the will of our patients; we are not free men to do with our time as we would wish to. We have our intimate friends, our old patients,—yes, new ones whom we are anxious to hold, who appear before us and ask our favors. The solution of the problem is a difficult one. You may say the remedy lies in two ways,—have some one to assist you, or be wilfully independent. I cannot believe the assistant will very much relieve the situation, and such independence is contrary to our nature. Let us, then, accept the situation, that while we are professional men we are also Yankees,—after the almighty dollar. We seek for honor, and wish to be held in esteem by the public and our professional brethren; but we also wish to make a living, do something more than simply pay our expenses. Very natural, then, when overcrowded with patients, to try and accommodate all, to work early and late rather than let some slip from our grasp. Under these circumstances what must the dentist be to withstand all this and meet with success? He must be a lineal descendant of both Job and Sampson. He must be firm, and yet sympathetic; be able to so control the mind of his patients that they will not worry him; be amiable, and woe to him who loses his temper. Good humor will sell more goods, build the best houses, plead the most successful cases, write the best sermons, and perform the best dental operations. Some one has said, "A melancholy musician may compose a dead march, but he cannot storm the castle of the soul with the rhythmic artillery of lovely light and joy." A melancholy poet may write Dante's "Inferno," but cannot give us Milton's "Paradise Lost." The world is full of music. The man who can sing and will not sing ought to be sent to Sing Sing.

"It is easy enough to be pleasant
When life flows by like a song;
But the man worth while is the one who will smile
When everything goes dead wrong."

If it is impossible to curtail our work while in the office, let us do all we can to recuperate when out of it. Let us ride some hobby. In change we find the most perfect rest. Don't forget the couplet of Oliver W. Holmes,—

"Run if you like, but try to keep your breath.
Work like a man, but don't be worked to death."

Reports of Society Meetings.

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, March 19, 1895, at the New York Academy of Medicine, No. 17 West Forty-third Street, New York City, with the President, Dr. Northrop, in the chair.

The secretary read the minutes of the previous meeting, which were approved.

INCIDENTS OF OFFICE PRACTICE.

Dr. S. G. Perry.—There is a fundamental law in operation, as those who remember their natural philosophy can recall, which, stated exactly, shows that heat, light, electricity, galvanism, and magnetism increase or decrease in the inverse ratio of the distance from the central point of this source. This is a fundamental and comprehensive law which has been overlooked in the construction of our hot-air syringes.

Years ago I constructed a hot-air syringe made like a little tubular boiler, and so designed that the air had to pass back and forth about twelve times before it could escape. I used it for a number of years, but it was never very satisfactory, because, as I see now, the source of heat was too far from the point at which it was delivered into the tooth. I have thought for a long time that none of these devices really filled the bill. I think, instead of letting the air come through a large hole, it should be made to pass through a very small one, and that the heated portion of the hot-air syringe should be at the very nozzle itself. When forced through a small hole, the air comes in contact with the metal and takes up the heat, and if delivered directly into the tooth, it does not become cooled, as when it is passed through a long tube after it leaves the heated air-chamber of the syringe. I had one constructed on that principle and attached to this rubber hand-belt, as you see here. When held in the flame and warmed to a reasonable degree, and then held over the tooth, of course the current of air is steady, because it is emitted through so small a hole, and the heat is held for some time, because the end of the syringe is enlarged and made like a very large, pear-shaped finishing-bur. The next step was to protect it

from the lips. Several years ago Dr. Bogue had the kindness to give me a hot-air syringe, devised by some one in Paris, with a rubber cover which could be pulled off for the purpose of heating the cylinder, and then slipped on to protect the mouth. There was great advantage in that, and I have used it for a long time. I had Mr. Drum make me a little shield of compressed paper, which is used at the present time by electricians. It is something like papier-maché, but much more dense. It is a kind of fibre. The next step was to have a nozzle made for my compressed-air apparatus. Some time ago Dr. Wassell, of Chicago, exhibited before the First District Society a beautiful hand-piece and cut-off for compressed air, and he kindly had one made for me. To this I have had one of these nozzles attached. I have never found a hot-air syringe quite so satisfactory as this device which I have here, which has a still smaller opening than the one made for the rubber hand-belt. The pressure of the cylinder just waves the flame of the lamp a little. Of course, this is all on the assumption of Dr. Brockway's idea that hot air is one of the best obtundents we have. I think it is, although it takes time and patience and care. I think I have been about as successful in obtunding sensitive dentine with the aid of hot air as with anything else.

Several years ago I called the attention of this society to a small tapering screw mandrel, constructed for the purpose of catching up a disk. It did fairly well, and I have used it with much satisfaction, and yet there have been many times when the disks did not hold as well as they should, or as well as I should like them. It occurred to me that it would be a very good plan to have a little extra thickness pasted onto the disk, in the form of a minute disk, as you see here. I had that done, making disks in this form, with a double thickness at the hub instead of the double thickness around the rim, like some disks on the market. These are picked up very quickly by the revolving tapered screw mandrel, and they hold better than with the single thickness. Of course, you can push them off if you try hard, but for ordinary purposes they do remarkably well. They will hold for all reasonable work that is done with an ordinary disk. This one is cutting on the inside now, which would be the severest test. Of course, on the other side the strain would not be so hard. But I found it was not necessary to have these disks pasted onto the large disks like the hub of a wheel. By having a block made with a depression of the exact size of the hub and of the disk, and putting the hub in first and the disk on top of it, and then plunging the revolving tapered

mandrel through them both, they are instantly picked up and held firmly enough on the mandrel to do all reasonable work.

Electricity is an unmanageable agent unless handled carefully. This little syringe that I have here has a personal quality, and it is very easily managed. It takes but a short time, for the heat required is very slight. Coming through that minute opening, the heat is taken up so quickly that only a very low temperature is needed.

Dr. Shields.—That is one of the objections I have found. It takes such a long time to heat it. With the electrical apparatus, in a second's time you have the exact temperature you wish.

Dr. Case then read his paper on "Dental and Facial Orthopedia."

(For Dr. Case's paper, see page 463.)

DISCUSSION.

At the close of the paper, Dr. Case made the following explanatory remarks:

Dr. Case.—If we apply force on one point of a tooth,—say a central incisor,—in a forward direction, however near the margin of the gum we attach the power, the tendency will always be to force the crown forward, leaving the apical end of the root in its original position, or with a tendency, perhaps, to force it in an opposite direction; because the fulcrum, or that which receives the immediate force, will, under those conditions, always be the opposing margin of the alveolar socket. If, instead of that, we band the tooth and solder a rigid upright bar to its anterior surface which extends above the gum margin, and to this upper end we attach another rigid bar that is threaded at its posterior end and passed through a long anchorage tube attached to the molars, with the nut anterior to the tube, we will still force the crown forward, leaving the end of the root where it was, because the fulcrum is still the same; the power is only applied at one point a little higher on the tooth.

But now, if we attach a small wire to the lower end of the upright bar and pass it through another tube which is fastened to the same anchorage that the first one was, with a nut at the posterior end, we have something to prevent the forward movement of the crown. In other words, we have changed the fulcrum from this point in the socket to the occluding end of the tooth, and now, as we apply our force, we have complete control of our power, and can

direct it to a forward movement of the entire tooth, or, as in Case VIII., oblige a much greater movement of the root than the crown.

I will now explain as minutely as I can some of the recent methods that I have used in the construction of the regulating appliances, and I will put on the board the sizes of the wire that I use. I wish to say that the entire apparatus, with the exception of the nuts, is made of German silver. I use German silver, not because it is cheaper than gold, but because I have found it to be better. There is no metal that can be made as rigid and as strong as German silver. I commence with a wire that is No. 10, Brown and Sharp's gauge; that is about .1 of an inch in diameter. That is about the only wire I buy. I draw it down to the several sizes that I use. There are three grades of German-silver wire: one is soft, another medium, and the other hard. You should use the hard, and in drawing it down do not anneal it. You can draw it down from No. 10 to No. 13; which is .07 of an inch. That is the wire I use for those strong bars for forcing forward the teeth. Where the bar extends in front of the anterior teeth it is flattened about half its diameter. The ends are threaded in the No. 0 hole of the Martin screw plate. That wire I use also for the upright bars. I also use the No. 13 wire for making the bands that surround the teeth. These bands should be very wide. The No. 13 wire rolled to .0045 or .005 of an inch in thickness will give you a band that is $\frac{3}{16}$ of an inch in width. Before rolling, anneal it, and again at different times in the rolling process. I take the measurement of the teeth in the usual way,—not from the model of the teeth, but from the teeth themselves,—drawing the ends together and soldering, being careful that no solder runs down on either side. I then usually fit it to the tooth. Then I solder on the upright piece of wire. When that is soldered, I again fit it to the tooth for the purpose of shaping the upright bar. It should fit the anterior face of the tooth. I give it a sharp turn forward at the gum margin, and then turn it back so it stands just in front of and almost lying against the gum. The upper ends of the upright bars should be cut off even with each other at the desired height, and the lower ends even with the cutting-edges of the teeth. The next thing is to cut a place for the power-bar to rest. Then I cut a groove with a small round file, at the lower end, for the fulcrum wire. Now we come to our anchorage: here also I use the wide bands on two or more of the posterior teeth. After soldering, these bands are carefully fitted to the teeth, as before, and an impression taken with bands in place. Then the bands are removed and placed in the impression, which is filled with

investing material. The bands on the resultant model are soldered together where they touch, and the tubes soldered in place, without the possibility of changing their shape or position. I am particular to have the power-bar tube soldered, so that it stands in a direct line with the applied force. Also, in regard to its other relations, supposing this to be the arch on either side, I endeavor to have the tube stand so that the bar, which is a rigid one, will pass just over the cuspid tooth. If you are not particular about this it will cause you considerable embarrassment and detract from its working possibilities. In regard to the other tube below, it is not material how that stands, because, this wire being small and flexible, it makes little difference whether it stands in a line with the force or not.

If, instead of forcing the root forward, we desire to get the opposite force, I use No. 16 wire for the power-traction bar, in place of the No. 13. This is threaded in the No. 4 hole of the Martin screw-plate.

The lower, or fulcrum wire, now exerting a pushing force, should be larger than the very small wire that was before used for pulling. For this I use No. 18 wire threaded into the No. 7 hole of the Martin screw-plate.

There is one thought that I wish to impress very emphatically, and that is in regard to the anchorage. These forces are many times very great. The turning of a nut on a No. 13 wire every day is a very great force. If we did not have the fulcrum wire below, we would find that there would be considerable movement of the anchorage teeth. But, having a pushing and a pulling force attached to the same anchorage, the force at this point is largely neutralized. It is like two men standing in front of me; I push this one with my right arm and pull the other with my left. My body does not move, because the two forces are reciprocal. Oftentimes I find that the original occluding position of the posterior teeth is not changed materially, notwithstanding that the roots of the front teeth have been pushed forward considerably. You will find that to be so when you examine the models I have here, and you will find it well exemplified in Cases VII. and VIII., where the relations of the upper molars and bicuspid with the lower molars and bicuspid are almost the same in the posterior teeth, notwithstanding that the anterior teeth have been pushed forward considerably. In Case VII. no appliance was attached to the lower teeth. In Case VIII. there was an apparatus put on the lower teeth for reciprocal force, with rubber bands to the upper appliance.

In making these charts I have endeavored to give you some-

thing more than a diagrammatical drawing. I have taken the model and placed it before me, and drawn by measurement, as nearly as I could with my eye, the exact size of every portion. This I have enlarged with a pentagraph two or three times, producing the final charts before you, which are exact, as you will find when you compare them with the models themselves.

In Case I. it will be found that the cervical portion of the incisor teeth have not changed position very much. They have moved back a little. The cutting edges of the teeth have been moved forward, and the apical ends of the root have moved back considerably, carrying with them the anterior plate of the process, and thus changing the character of the facial features at this point. She had a bulging appearance of the upper lip which was quite unpleasant. The improvement to her face is inadequately shown by the models, and quite remarkable, considering the slight change, by actual measurement, that has been produced in the depression of the superior portion of the upper lip and lower portion of the nose.

The President.—At the suggestion of Dr. Case, the members will now have a recess of about ten or fifteen minutes to examine these models.

Dr. Case.—I would like to speak of Cases VII. and VIII. These are two that were exhibited at the World's Dental Congress. I have brought them with me because they particularly show the movement of the roots of the teeth, and the effect that can be produced on the face. The casts of the teeth themselves show that remarkably well. In Figure 7 I want you to lift the model off from the articulator, and look at the change that has occurred in the alveolar arch,—how the entire arch has moved forward in the movement of the four incisor teeth.

Now that the paper is open for discussion, I would like to say that if you care to please me you will confine yourselves to the points of the paper,—that is, to the movement of the roots of the teeth for the purpose of correcting facial deformities, or facial defects. I speak in this way because I have had a little experience with New York dentists. I remember quite distinctly reading a paper before a certain society of this city upon a branch of crown-work, which was confined solely to the border line between the band that surrounds the root of a tooth and the root itself. My purpose was to urge, so far as I could, a more perfect operation at that point, for the same reason that you are particular in finishing the cervical border of your fillings. Gentlemen there criticised me and ex-

pressed surprise because my paper did not go further into the entire operation, even to shaping the root; and in the discussion, instead of confining their remarks to the only point I attempted to cover, a number went into lengthy detail of various methods of crowning teeth that were entirely irrelevant to my paper.

Dr. Guilford.—In common with the essayist of the evening, I must say that I feel greatly honored in being invited to appear before the Odontological Society. When the invitation of the Executive Committee came to me, I did not question their right to command me or any one else to come here; but I must question their right to meet us upon our arrival, and, by feasting us, incapacitate us for speaking upon a subject as we would like to; for you all know that when the blood is drawn to the stomach it leaves the brain.

When I consented to come, it was with the distinct understanding that I should be furnished with an outline of the paper, and when that outline came it was simply a heading of four lines, which gave me little clue. Fortunately, however, I had the proceedings of the Columbian Dental Congress, and I looked over them, thinking that Dr. Case would go over the lines of his paper before that body, improving upon them, of course, and in that way I received some inkling of what he would say to-night.

I desire, first of all, to congratulate Dr. Case upon his paper and his work, because I think he has done a remarkable thing. He has taken the subject of orthodontia, which has received considerable treatment at the hands of many of our best men, and has materially improved it. He has accomplished results that I confess I never have accomplished, and which I would be very glad and proud to have done. If I take exception to anything he has said, or criticise, it is simply because I want to understand the subject a little better than I do. In the movement of teeth one of two things takes place. On the one hand we have the alveolar tissue resorbed in front of the tooth, and a new tissue formed behind it; and, on the other hand, we have a moving or bending of the alveolar plates or of the entire alveolar process. In many cases we have both. That a tooth, in moving, does not plough its way bodily through the alveolar plate is shown by the fact that after a tooth has been moved the alveolar plate is not materially lessened in thickness on the advancing side of the tooth. It did not have time to be resorbed and reformed. In the movements produced by Dr. Case, he has not only undertaken to move the alveolar process, but to move bodily forward the entire tooth or

a series of teeth, roots as well as crowns, and the models look very much as if he had accomplished it. It is certainly very true that he has produced wonderful results in the improvement of facial expression. What he has done he proposes to designate by the new name of "dental orthopædia." He suggests that term in preference to the older term which we have been accustomed to use,—orthodontia. I agree with him in the statement that the word "orthodontia" does not fully express the idea that he wishes to convey by the methods which he has adopted and the results he has attained. Orthodontia is a word that falls a little short of expressing it. But the question arises, Does the word "orthopædia" properly express it? Does not that word express too much? He defined very nicely what orthopædic surgery consisted of,—the correction of deformities of the body. It is derived from two Greek words,—*orthos*, "straight," and *pais*, "a child," which means really a straightening of the child. Dunglison says that the term at best is incorrect, and that we should use words that express a straight body, because orthopædia expresses the idea not only of the correction of a deformity in a child, but also in an adult, and it is not the child that is straightened, but the bones. Consequently, we do not derive any benefit from taking a word which is incorrect and expresses too much, and substituting it in place of another word which falls a little short in its meaning. While it does not exactly express the idea we wish to convey, the word orthodontia comes nearer to doing so than any other, and hence seems to be the better word to employ, for when we correct facial expression we do it by the movement of teeth. In regard to the movements that have been spoken of by Dr. Case, we must remember that the alveolar process is built up on true bone, and it is thickest where it is attached to the bone. As that extends downward it gets thinner and thinner, until it terminates entirely at the neck of the tooth. At this point there is less bony tissue to be moved, and it can be more readily moved than where it is thicker. The apex of the root is nearly stationary in ordinary movements, but as we move the crown we must overcome the resistance of the alveolar process at its margin where it is thin, midway where it is thicker, and at the apex where it is thickest. When we undertake to move a tooth bodily, forward or backward, we have the resistance all along the line of the root, and we have the greatest resistance at the apex of the root, because there the alveolar process is thickest. To move the apex of the root any considerable distance would require the expenditure of a great amount of power, and probably necessi-

tate the moving of the maxillary bone as well. Can this be done? That Dr. Case secures a movement at the end of the root I believe, but that he accomplishes it to the extent that he thinks he does I very much question.

In all the cases represented here, with possibly one or two exceptions, you will notice that where he has moved the teeth of one jaw, he has also moved the teeth of the other.

In determining the amount of movement that we get, or the real effect of our operation in the movement of the teeth of one jaw, we ought to have a fixed point to calculate from. When you move the teeth of both jaws, one in and the other out, you remove the basis of comparison, and do not know exactly what you are getting. We do not know how much the one has moved in and the other out. We get the improvement in expression, but it is a question whether we have moved the roots of those teeth as much as would appear. While, therefore, Dr. Case has accomplished wonderful results, there is a question in my mind whether he has not overestimated the amount of motion that he gets along the entire length of the roots of the teeth in many cases. In every extensive case of irregularity that we correct, where we propose to move the upper teeth or the lower ones, we get an improvement in facial appearance that is very considerable. If the results are not as marked as those shown to-night they are nevertheless remarkable. I have often been surprised at the change in facial expression brought about by the movement of the teeth. I suppose we all move the roots of the teeth more or less, but I doubt whether we change them as much as Dr. Case would have us think.

I brought the models of some jaws with me to-night which prove the point I spoke of. In one case where there was marked protrusion of the lower teeth I decided to do two things, the first of which was to retract the lower jaw. I used a skeleton cap for the head and a metal and leather chin-piece, with rubber straps connecting the two. In addition, I employed a vulcanite plate with spurs of gold fitted to the roof of the mouth to assist in guiding the lower incisors into place. This was kept in place by platinum bands attached to the molar teeth with lugs at each side. In this way it was held in position while the lower teeth bit upon it. After using this chin-appliance for a while, I seemed to have accomplished a very wonderful result; but the gain ceased very soon, and I had to try something else. I extracted a bicuspid on each side, and retracted the six inferior anterior teeth. In the end I secured a very perfect occlusion, as you see.

While the deformity in this child's face was very marked indeed, as soon as the upper teeth were brought out and the lower ones in, the entire expression was changed and harmony of the features restored. I did not try to move the apices of the roots of those teeth, and yet I secured as perfect results as I could have wished for. Again, I desire to give Dr. Case full credit for what he has done, which is certainly a great advance upon previous methods, and at the same time to thank him for his splendid exhibition of masks, casts, and appliances.

Dr. Bogue.—Before undertaking to discuss any portion of Dr. Case's paper, I should like to express here a hope that Dr. Guilford will show us all, one of these days, the models (both before and after) of a retracted set of fully erupted lower teeth where the bicuspid have been extracted, and the teeth anterior to that space so formed have been retracted. With a pair of compasses in my hand, I should like to examine such a case.

Dr. Guilford.—There is one right here, Dr. Bogue, which you may examine at your leisure. This is a case where the two bicuspids were extracted before either they or their neighbors had attained their full size or assumed their rightful positions in the jaw.

Dr. Bogue.—It has been claimed that the apical ends of the roots of teeth do not move from their original locations, but when Archimedes discovered the identity of the inclined plane with the wedge, wheel and axle, and screw, he exclaimed that if he had a place to stand he could move the world. Dr. Case has apparently found a place to stand. I expect to see him move the dental world, as well as the apical ends of the roots of teeth. But, as we are only to discuss this evening the operation of his instrument on the six front teeth, we are far from settling the question of orthodontia in general. While I have unstinted praise and admiration to offer for Dr. Case's admirable invention, and believe it the most efficient and at the same time the simplest instrument thus far devised for its purpose, I will beg the gentlemen present to notice carefully that Dr. Case does not enter into the discussion of, nor even touch upon, the subject of the proper occlusion of the grinding surfaces of the molar and bicuspid teeth, upon which depends, in a large degree, the ability to masticate, and hence to prepare for the digestive process all food taken into the mouth. Leaving out of view, therefore, this matter of occlusion, where, possibly, I might have some sharp differences of view with the essayist of the evening, I will confine myself entirely to the discussion of his means of beautifying

a countenance more or less deformed through the malposition of the six front teeth. In all orthopaedic surgery the question of bending the immature bone of the growing child has to be considered, and its advisability decided upon, and then means are adapted to the end desired. Now, whether it be ring bone in a horse, or certain morbid growths on the bones of the human body, or the change in location of a child's tooth, a positive pressure which is periodically repeated, with intervals of rest between, is, I believe, the best mode yet discovered for accomplishing that object. Dr. Case has recognized this principle, and has adopted the screw as his motive power. The screw, unlike the elastic pressure of a spring, can be made to give a definite advance by means of definite pressure, and then stop, that nature may recuperate until the time arrives for another application of pressure. Another point needing to be carefully noticed in this discussion, and in all action growing out of a necessity for these operations, is the age at which the roots of the teeth attain their full size. This question has a deep bearing on all that Dr. Case does for children, and it will go far, I think, to explain some occurrences that take place in his operations for adults. If the skull of a child of six years be examined by dissecting away the anterior plate of alveolus covering the permanent teeth that are just about to erupt, it will be found that the roots of the first permanent molars whose crowns are entirely through the gum are not fully grown, and consequently have no apices; so that if the bodies of these teeth are moved to any position different from the location in which the crowns erupted, the further growth and completion of that root will take place while the tooth is in that position. This is still more true of the other molar, bicuspid, and cuspid teeth, the crowns of all of which, excepting the wisdom-teeth, are in the skull at that age.

The main point which occurred to me in discussing the question with Dr. Case was that perhaps none of us had sufficiently examined into these questions of development which, under these circumstances, seemed to me to be of paramount importance. It will be seen with a moment's thought that the exact age at which each tooth is completed is a matter of very great consequence when we apply fixtures that move the crowns from one position to another, and still more must we be positive of the time of completion when we undertake to move not only the crowns but the roots bodily, and to endeavor to have that action reflected in the alveolus and the outer integuments of the face. I did not want to do much more than express my thanks for the apparatus which has been shown,

and in saying what I have I must beg the pardon of the gentlemen for not having been able to go into the matter more carefully.

Dr. Farrar.—This society should congratulate itself upon having such an interesting presentation of this subject as the essayist has given us this evening. Now, to his question, do we “believe that the bones around about the roots of the teeth were bent?” I will say I think they were; but just how far they were bent, or just what and where all the parts were altered, of course can only be inferred from the outward appearances. If we could take the flesh off the bones before the operation, and then take a cast of the bone, then return the flesh, regulate the teeth, and then take another cast, we could prove the facts; but at present we must be content with reasoning upon the subject. That the bones under the lower part of the nose can be bent by applying force to the incisors I have had proof of in some of my operations. Let me tell how I first caught upon the fact. Several years ago (1886 and 1887) I had occasion to regulate a case of protruding upper teeth for a young lady about fourteen years of age; the lower part of her lower lip was somewhat prominent, but the upper part was not as full as it should have been. I drew the lateral incisors posteriorly (after having caused the cuspids to naturally move into the places of the extracted first bicuspids) by a gold skeleton mechanism anchored to the posterior teeth, and when these teeth were in their proper places (against the cuspids) the same mechanism was applied to the centrals; but the anchorage resistance was not sufficient to move them far without moving the posterior teeth forward, therefore I was obliged to resort to the skull-cap or head-gear, a sort of harness, having gold draught wires connecting it with the ends of the crowns of the incisors. By retightening this harness these teeth (crowns) moved posteriorly, in the same way as other dentists have noticed in their operations; but now comes the point intended by mentioning this case. One day the father called on me and said, “Myself and wife have concluded to take our family to Europe; now, how soon can you push my daughter’s case through?” He also told me when he would like to sail. I replied, “It can only be hurried by increasing the force, and perhaps the case will not permit of great increase without causing too much pain; but I will immediately begin the trial.” The draught upon the teeth was increased gradually, and in a few days it was carried to a point that caused the head to ache slightly. Shifting lower a part of the anchorage so as to include the base of the occipital region, the full force was maintained. During all this time, however, the patient

said that she noticed no pain about the teeth, but incidentally remarked that there was a peculiar feeling just under the nose. This, however, made no impression on my mind, as I had often heard similar remarks from other patients under similar operations.

We were now applying all the force that the harness would permit without causing headache, and the teeth were moving gradually,—but not as rapidly as the parents desired. To my surprise, however, the father and daughter called one evening about ten o'clock, and said, "My daughter's teeth are now moved in far enough." I examined the case, and sure enough the teeth had moved more rapidly than I ever knew teeth to move before, and had reached their proper places. But what had caused the sudden change seemed mysterious until I examined the contour of the entire lip and nose, and found that the same changes had taken place that Dr. Case's casts present. The upper part of the lip was now filled out, and the end of the nose was slightly advanced.

Dr. Case.—Were the nerves destroyed?

Dr. Farrar.—No; nor were they injured. It was plain to be seen that the drawing upon the ends of the crowns had thrown the roots forward, and that this was the cause of the outward changes in the lip and nose; but whether the suture between the halves of the upper jaw-bone had yielded and the borders of the bone turned outward, or whether sufficient decalcification had taken place in the bone to enable it to bend by the leverage of the teeth upon it, I could not determine; but one thing was certain, great changes had taken place in its contour, and that the roots of the teeth had moved forward *en masse* by tilting on fulcrums at the necks. (See *F* in Fig. 1.) This was a lesson that led me to an idea of the possibilities of such operations, and I immediately determined to work upon this line with improved mechanisms. I now have some half dozen, all based upon philosophical laws. I have brought with me several engravings of these, taken from my forthcoming volume, which I will pass around after I have sketched them upon the black-board, so as to explain their action. I wish to say, however, before I proceed, that I regard Dr. Case's mechanism not only simple but philosophical; that it is practicable he has proven by his results. Mine differs from his, and, therefore, the combination of his mechanism belongs to him.

As you will finally see, the engine of force in all of my mechan-

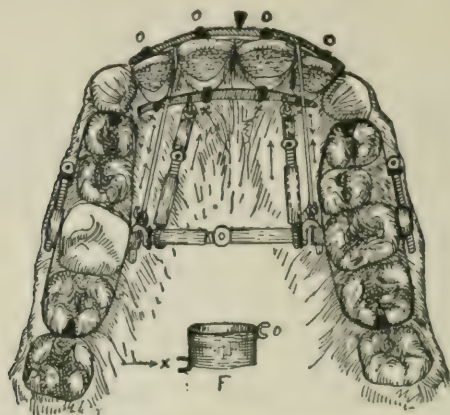
FIG. 1.



Showing the changes made in the position of the teeth.

isms for moving roots *forward* are placed within the dental arch, instead of outside of it, as in the essayist's cases. In the mechanism represented by this sketch (Fig. 2) the base of support is a trans-

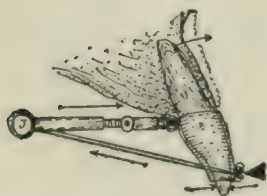
FIG. 2.

Mechanism for moving the roots forward *en masse*. (FARRAR.)

palatine screw-jack, anchored by two clamp-bands, that embraces the side teeth; from this jack to the posterior sides of the necks of the incisors, and lying close to the sides of the arch, are two other screw-jacks to press against these front teeth; to hold these jacks upon them, each incisor has upon it a broad ferrule (cemented), with a U-shape lug on the lingual side, near the gum (see *F* in lower part of Fig. 2), in which a bar connecting the anterior ends of the jacks

rests. To hold firmly the ends of the crowns of the incisors, and prevent them from moving forward when these jacks are set at work against the necks of the teeth, they (the ends) are tied to the transpalatine jack by two wire cords, connecting with a cross-bar lodged in other U-shape lugs soldered to the labial side of the ferrules, near the ends of the teeth, as represented by this sketch. (See Fig. 3).

FIG. 3.

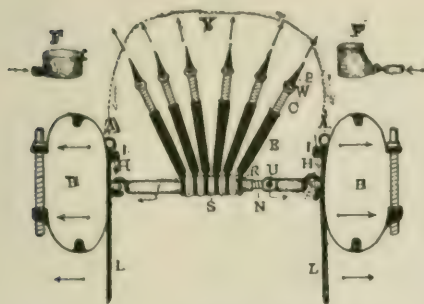


Showing the principle of applying compensating force.

In another mechanism I use more radial screw-jacks than in this one, for forcing the roots forward; these are arranged thus (see Fig. 4). The ends of the crowns are held fixed by a wire bow (see Fig. 5) placed in U-lugs (see dotted line in Fig. 4), one being hooked

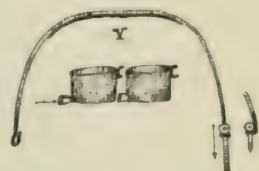
into a wire ring soldered to the lingual side of one of the anchor-bands, and the other screwed to the corresponding side of the other band. (See *A A*.) It is a modification of my screw long band.

FIG. 4.



Radial screw-jack mechanism, for moving the roots of six teeth forward. (Farrar.)

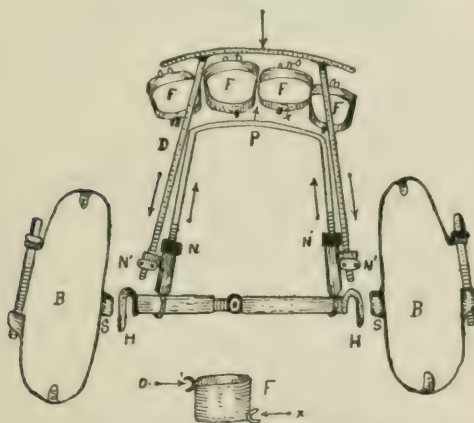
FIG. 5.



The check-bow belonging to the radial mechanism. (Farrar.)

Another and similar mechanism is made like this sketch (Fig. 6). It consists of two anchor-bands (*B B*), a transpalatine screw-

FIG. 6.



Mechanism for moving forward, *en masse*, the roots of the upper incisors. (Farrar.)

jack with two hooks (*H H*), four ferrules (*F F F F*), a pushing bow (*P*), operated by nuts (*N N*), and stay- or check-cords (*D D*), with a cross-piece.

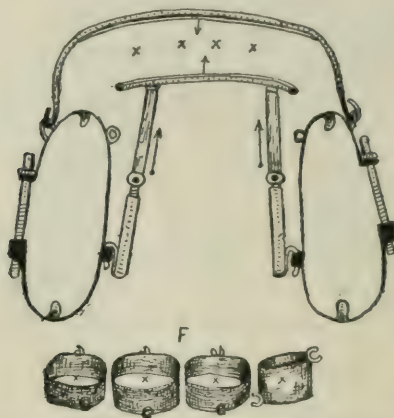
Dr. Jarvie.—What are they for?

Dr. Farrar.—To hold the crowns and to throw the roots of the incisors forward.

This mechanism is operated by four nuts (N N, N' N'), two to push the bow (P) forward, and two to draw the crowns backward. The extremities of the arms of these rods play in smooth, bare tubes and nuts, as shown here.

This next figure represents another mechanism for the same purpose. (See Fig. 7.) It consists of two anchor-bands, two screw-

FIG. 7.

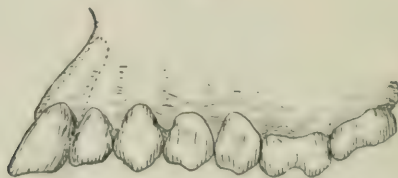


Mechanism for moving forward the roots of upper incisors *en masse*. (Farrar.)

jacks soldered to a cross-piece, four ferrules (F), and a wire bow. The main difference between this mechanism and the first one described (Fig. 2) is that there is no transpalatine jack, the anchorage of the two jacks being made directly upon the anchor-bands, as shown.

As will be seen, all these mechanisms are for moving *forward* the roots of the front teeth where the upper part of the upper lip

FIG. 8.



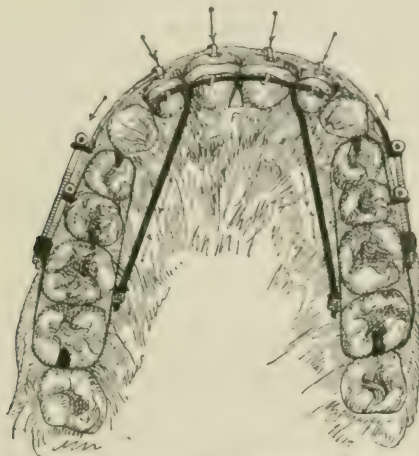
Representing an example of the class of cases that require the moving forward of the roots of incisors.

is sunken, as represented by this sketch (Fig. 8); but for moving the roots posteriorly, as needed in cases where the upper part of the

lip is too prominent, they would not be practicable without some modifications being made in them; these modifications can be made easily. This mechanism, like all the others that I have described, acts compensatingly, one force upon the anchorage being balanced by the others.

The following sketch (Fig. 9) represents a mechanism designed for this purpose, and it is very similar to several that I

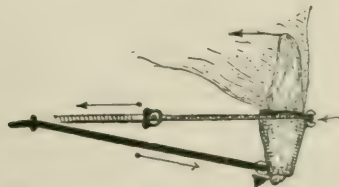
FIG. 9.



Mechanism for moving posteriorly the roots of upper incisors. (Farrar.)

published many years ago. The crowns are stayed by an inside rectangular frame, resting in U-shape lugs at the ends of the crowns, and braced against nuts soldered to two anchor-clamp bands on the side teeth; the roots are drawn back by what I call

FIG. 10.



Showing the philosophy of the use of the brace and long band.

a screw-acting long band resting across the labial sides of the necks of the teeth to be acted upon and attached to the clamp bands by screws. (See Fig. 10.)

Now, in regard to Dr. Case's beautiful presentation of face-casts. I wish to compliment the essayist upon his ability to secure the privilege from his patients of obtaining them. I am seldom successful in obtaining even a photograph, much less a cast. Whether the people in New York are prouder than they who live in the West, I do not know, but could I have the privilege given to Dr. Case I think I could present some very interesting cases in the line of orthodontia, but nothing more interesting in this line than Dr. Case has given us.

Dr. V. H. Jackson.—The subject that Dr. Case has brought before us I have been interested in for several years, and would like to call attention to a paper I read before the Odontological Society in 1887, in the discussion of which I stated, "At some future time I will describe my method of carrying the incisors forward bodily without changing their angle" (*Dental Cosmos*, vol. xxix., page 385), and since then I have been interested in moving the teeth bodily; but then it was not accepted by the profession.

Dr. Case has proven in this and previous papers that it is possible, and from my experience I can say that I have practised for several years moving the roots of teeth in the direction desired.

I want to congratulate Dr. Case in presenting the matter in such a delightful manner as he has done with the models of the face. I have adopted a system of making measurements of the face and also the contour, which I think will be of service to the gentlemen present. I will explain that before describing my method of moving teeth bodily. My method of making a permanent record is to take a piece of soft lead or tin wire about one-eighth or three-sixteenths of an inch in diameter (the square is usually preferred), which is shaped to the contour of the features, usually first following the contour of the median line to show the profile, then placing the wire on manilla paper or card-board, and with a fine pencil marking the curved outlines formed by the shape of the wire. The paper is then cut following the pencil line, if the work is well done it will be found that the paper will fit accurately to the features in the line the wire was made to assume. Any other angle or measurement can be obtained in the same manner, and the card-board preserved as a permanent record, which will be of service in noting the changes in the shape of the features, either for immediate use or to note future changes.

Dr. Jackson demonstrated with a patient the method as described.

It is tedious work to make plaster casts of the face, and I would

like Dr. Case to explain to us his method of making them. I have recently used modelling compound more or less for this purpose by rolling it thin with a rolling pin, and placing it upon a piece of thin sleazy cloth that is capable of changing its form. It is then softened by holding either end of the cloth and running it through a warm-water bath. This is then applied, the patient having become accustomed to the heat by the application of cloths wrung out from warm water. I have found that pressure in applying the modelling compound will occasionally push the soft tissues out of shape, especially the nose and lips, and will not give a correct reproduction of the features; consequently, I frequently cut a hole in the centre of the compound and cloth sufficiently large to pass over the nose and mouth, and, after adjusting it, introduce into the nose a quill wound with cotton, so that it shall not interfere with the breathing, and cover the portion of the face that is exposed with plaster of Paris. In most of the models that Dr. Case has presented the patient had the advantage of breathing through one nostril, as only one side of the face was taken. There are several deviations from the method described which I have practised. I think the plaster of Paris gives a better effect than the compound. A thick roll of compound may be preferable for making a model in certain cases.

With regard to moving teeth other than superior incisors bodily, in the discussion of a paper read before the First District Dental Society at an anniversary meeting, in speaking of the results of spreading the arch, I described that the teeth (molars and bicuspids) are often elongated by the resistance of the true bone of the malar process of the superior maxilla, which "often complicates the operation of spreading the arch, as it does not yield as readily as the alveolar process, and the teeth are forced over it, which elongates them." That shows that I looked towards the moving of the roots bodily through the bone. I have accomplished this work in a different manner than either Dr. Case or Dr. Farrar has presented.

One method for moving the incisors outward without changing their angle is to fit a very broad collar to each of those to be moved. I will illustrate it on the board. An arm is attached with solder to the lingual side of a collar cemented to one of the lateral incisors which is formed to extend back, following the lingual curve of the teeth to the second or third molar. The effect of this would be like fastening a collar with an arm extending from it around the end of a cane and pulling on the cane; pressure would be caused on the whole length of it, providing you have a stiff arm to support

it. Here would be the root and here the crown. A short arm is then soldered to the lingual side of the collar on the central incisor, and made to form a gentle curve to and is soldered to the arm that extends to the distal part of the arch. A similar long and short arm is soldered to the collars on the other lateral and central incisors which extends back on the other side. A crib is then made over a bicuspid and molar on each side of the arch for anchorage. A base wire is arranged to cross the arch following the palatine curve, passing over the arms described, and is soldered to the crib portion on each side. Tubes can be attached with solder to the crib portion underneath the base wire through which the arms can pass, preferably with the under side of the tube cut away. A long U-shaped loop of spring wire should be formed for each side of the arch, one end of which should be soldered in front of the base wire near the tube; the other end should project a little above, and made to catch into a hook that is soldered to the arm that extends back from the incisors. The necessary pressure to move the incisors outward is caused by opening the loops by bending and springing them into the hooks that are attached to the arms. A similar appliance is constructed for moving the ends of the roots inward, by reversing the hooks on the arms, and having the looped spring arranged so as to pull inward rather than to push outward as described.

With regard to the movement of the roots of incisors, I have had results that have led me to believe that the premaxillary bone has been moved forward or has assisted in compensating with the pressure that is against it. Some of the sutures do not unite.

I would like it to go on record that I have called attention to the consideration of the shape and size of the nose before regulating the teeth. I have spoken of it for several years in class work, etc. The shape and size of the nose should always be studied in connection with the features before regulating, and especially to determine whether to move the superior inward or to move the lower teeth outward.

I am glad that Dr. Case has brought before us such beautiful specimens and charts.

[NOTE.—Dr. Jackson intended to describe the following appliance (but was called to order for lack of time) which he had devised for moving the incisors forward bodily, all of which, except the collars, can be removed for cleansing. It was made by soldering a tube or socket in the palatine surface of the collars that were cemented to the incisors. A heavy base-wire was then formed in

the usual manner, with short arms soldered to it in position to project into the tubes soldered to the collars. The other portion of the appliance was made similar to the one described.]

Dr. Case.—I have been exceedingly gratified at the kind remarks which have been made on my work by men of great eminence who are here to night, and it has given me much pleasure. I look upon this work somewhat as I would on a child that I am bringing up and introducing to the world. I feel grateful to you that you have shown me the compliment of asking me to come here and represent things just as they have occurred in my practice. That is a great deal. In Detroit, the other day, I listened to a poem the sentiment of which was something like this: In our youth the greatest thing we strive for—the golden apple that we seek to pluck from the tree of time—is fame, followed, possibly, by wealth; but as the years go on we come to understand that it is greater to be loved than to be honored; greater to be trusted than admired. And that is the way I feel to-night,—that it is greater to be trusted than to be admired, because there are so many opportunities where one could deceive. I want this child to come up before the world without any deception whatever, and I have brought these models here because I believe they exactly represent the changes that have taken place. How a man like Dr. Guilford can examine some of these models,—for instance, the model of Case VII.,—and look at the change that has taken place forward of the cuspid teeth, leaving the articulation of the posterior teeth exactly as they were, and say it is any different from what it seems to be, strikes me as very strange indeed. There was nothing put on that lower jaw at all. In Case VIII. there was no change to the lower jaw. You can examine the jaws of all these teeth, and you will find no special change to the lower teeth. As far as the articulation is concerned, that can be adjusted in time, if it is broken up.

In regard to the change in features of the face, that is dependent upon more than a movement of the teeth and alveolar process. The bones of the face are similar to other bones, and are undeveloped and largely cartilaginous until a certain age. When we apply force to the teeth in this way, the teeth are merely used as places for attaching the force appliances; so that the force is directed to a movement of the entire bone in which those teeth are embedded,—not the process alone, for, it strikes me, it must go farther than that, in order to affect so much of the middle features of the face. Case I. shows the effect upon the nose, which was decidedly *retroussé*,—and turned up at the end. It was brought down and

straightened. I have a number of cases in my office where this is particularly exemplified. In Case II., you see, the nose is changed from being turned down at the end to a straight nose. In Case III. the nose was made straight at the end. Case VIII. was a young lady, a Jewess, with a nose characteristic of that race, but I made a Yankee of her, as I told her. I had believed, and I do believe, that force applied in this way affects not only the alveolar process, but the shaping of the bones of the face.

In regard to casts, or models of the face, it is an easy matter for any one who has the proper individuality, to get an impression. If you are going to construct an artificial denture, you simply say you must have an impression, and you get it. You do not say, "Please allow me to take an impression of your mouth." You say, "We are now ready for the impression;" and if the patient says, "What! are you going to take an impression of my face?" you say, "Yes, of course; it is my guide."

It is a simple thing to take an impression of the face in plaster. I wish I had the opportunity to show you how easy it is. It takes less than ten minutes from the time you commence putting on the plaster to the time it is off the face. I have often had my son time me from the time we commenced to put on the plaster until the removal of the cast, and it often has taken no longer than six minutes. It does not inconvenience the patient very much. I will describe the method as nearly as I can. I have two bowls, to commence with. I say to my son, who assists me, "I am going to take a face-impression." He fixes the water in both bowls; puts in sulphate of potash, the right amount to make it set rapidly; then I have a bowl of clean white vaseline, with a clean brush. That congeals in the ordinary temperature. It is put into a bowl of hot water until it becomes liquid. The bowl is brought to my side. In the mean time I have composed my patient, told her just what I am going to do, first covering the face with vaseline, which I proceed to put on the face, talking to her all the time. Where it goes over the eyebrows, or where there is considerable hair on the face, I go over it twice or more. One of my patients told me the other day she could never keep her face straight, and I told her to laugh all she wanted to. Had I told her not to laugh, she would certainly have done it. I turn the patient on one side or the other, just as is most convenient. I compose the face, having gone over it with the vaseline, telling them to see that the teeth are closed in the masticating closure, and telling them to keep the mouth and face still; then I say to my young lady assistant that I am ready

for my first bowl of plaster. My son fixes that, she brings it to me, and I lay it on with the spatula, beginning with the mouth, because I want that most perfect. If the patient does laugh, I can take it off and start again. I carry it back as far as I can, and when it commences to harden I call for another bowl. I go right on, having the patients open their eyes while the plaster is being carried close to the lower lid, then over the ear, having a little cotton in the ear,—and that has probably finished two bowls. Over the face itself the plaster is about one-fourth to one-half of an inch thick. The next bowl of plaster is carried over the forehead, eyebrows, and upper lid of the eye, which at this time is closed. Then there is a little slit left there that is slightly open; you can see by the models I have here. I have used possibly three bowls by this time, and then another one is brought. The last one I order with enough sulphate of potash to set very rapidly. Then I bring that over the nose, and meet the other parts of plaster. You do not put anything in the nose. You simply manipulate your plaster right off the end of the spatula, so the nostrils are left open, and you do the same when you take the entire face. As soon as the plaster commences to harden you will have a syringe of cold water to throw on. You must keep it wet and cool while it is hardening. When sufficiently hard, tell your patient to move the muscles of the face a little; get a slight tension on the borders of the impression,—not too much,—and then it all comes off in one piece. It never takes over ten minutes; generally I get it in six minutes. It is a very simple thing, and after the patient has gone through the process once you can go through it as often as you like for that patient.

Dr. Guilford.—I am very much afraid that Dr. Case misunderstood me, or else that I did not express myself clearly. The principal idea I meant to convey was that in the cases shown here, with the exception of the two he mentioned where the lower jaw was not operated upon, having moved both the upper and lower jaws, he was perhaps mistaken in the amount of movement he had secured in a single jaw, and that he was giving one jaw credit for greater movement than had actually occurred.

The thanks of the Society were tendered to the essayist and the gentlemen who took part in the discussion.

Adjourned.

JOHN I. HART, D.D.S.,

Editor New York Odontological Society.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

THE regular meeting of the Odontological Society of Pennsylvania was held February 9, 1895, President C. N. Peirce in the chair. Upon the conclusion of routine business, the President called upon the essayist of the evening, Dr. R. M. Sanger, to read his paper on salol.

(For Dr. Sanger's paper, see page 472.)

DISCUSSION.

Dr. Crouse.—I am not at all familiar with the material here recommended, and should not care to give an opinion without some investigation. I have had one material for root-filling that has satisfied me for twenty years. I am not casting around for new root-filling materials. I have but one way of filling a root of a tooth, and I do that with oxychloride of zinc, carrying it to the point of the root, with one or two laps of No. 10 gold on a very small broach, wrapped on in such a way that when the broach comes away the gold will stay there. I have practised that out of the mouth and in the mouth, and I do not know of a single failure. Still, I am very glad that some of the younger men, who have more time than I, are looking up the newer things.

Dr. Faught.—I have not used this method. Like Dr. Crouse, for the twenty years I have been practising I have never departed from one way. I fill all my canals with cotton. But I can readily understand how I might be induced to follow the modified plan of my worthy friend and use salol as directed.

Of course, those who use oxychloride of zinc never expect to take it away, never have failures, and never remove it; but I have seen a great many oxychloride fillings under most distressing conditions. I do not care to close a canal with anything that cannot be removed, and it seems this material can be removed at almost any time.

Dr. Deane.—Under encouragement of Dr. Kirk I took up the use of salol for the filling of root-canals. The method by which I apply the salol differs somewhat from that pursued by the essayist. After applying the dam, I cleanse the root thoroughly by the application of sodium peroxide in powder, working it down into the canals by the use of a fine broach from which the barbs have been removed; then, applying one or two drops of water, I allow it to remain until all effervescing has ceased. A piece of sponge is laid by the side of the cavity to absorb the water. I wash out all the

solution of peroxide and apply hot air; when thoroughly dry, a fine broach is warmed and carried as far up the canal as possible. Then the salol is taken between the beaks of a pair of long, flat foil-pliers and passed over the alcohol flame, when it immediately melts. I then place the points of the foil-pliers, containing the melted salol, on either side of the warm broach in the root-canal, and gently open the forceps. The salol will immediately run up the broach and fill the canal. Gently withdraw the broach, and if any air is at the apex of the root it will be seen to follow the broach down and appear in a bubble on the surface of the salol. Apply cold air and fill at once.

An experience has led to some thought. Recently I filled a lower six-year molar. I felt sure both roots were entered. It was a case I could watch carefully. It was opened the other day, and in one of the roots not a particle of salol was found; and yet it had been carefully sealed. Dr. McQuillan has had the same experience.

Dr. Sanger.—Was the root putrescent before it was filled?

Dr. Deane.—Yes; and there was an abscess, I believe. The apex of the root was open sufficiently to allow the salol to pass through. The abscess healed very nicely, but I want to know what became of the salol.

I wish to call the attention of the Society to the use of sodium peroxide for cleansing putrescent canals. Take a spatula and force some of it into the root with a broach, and moisten with a little water. It will boil up and fume a few minutes; then wash it out and dry the root with heat. I have so treated several roots that had bad putrescent pulps, and filled them immediately. Up to this time I have had perfect satisfaction with the treatment.

Dr. Broomall.—Has salol any therapeutic action upon a diseased root, or does it act only as a sealing structure?

Dr. Sanger.—As stated in the paper, the action of salol is that of an antiseptic. I have thought the action of the crystal might be analogous to that of carbolic acid; whether it is so has not been determined.

Dr. Broomall.—That is what I wished to know. When we fill roots with cotton we usually soak it in some remedial agent. I was wondering if this article had any such qualities that would render it superior to carbolic acid.

Dr. Curry.—I have used salol in six cases, and in four of the six there was decided pain. Has the essayist found it to contract or crystallize?

Dr. Sanger.—I have no knowledge of its contraction. I have tried it in roots out of the mouth and in glass tubes, and have never had any trouble such as the doctor describes. I am at a loss to understand the cause of pain, unless the salol passed through the apical foramen.

Dr. Brubaker.—I believe it is the general impression that salol, when it comes in contact with the alkaline basis in the small intestines, is converted into carbolic acid or salicylic acid, and all the virtues of salol are largely attributed to these agents.

If salol is introduced into the tooth and it passes through the apical foramen, there is a possibility that the alkaline plasma which is around the foramen of the tooth would decompose the salol into carbolic acid and salicylic acid. Therefore in the root-canals salol would simply act like carbolic acid.

Dr. Warren.—I have never used it clinically, but have had experimented with it out of the mouth. With lower molars or bicuspsids, where gravity would act, the roots, on being opened, were found to be filled perfectly to the end; but where the tooth was held in such a position as they would occupy in the upper jaw, the roots were not filled. When a warm instrument was introduced, gravity would draw the material back.

No one else responding, the President called upon Dr. Sanger to close the discussion.

Dr. Sanger.—I purposely avoided the question of root-treatment. We presupposed that the root was ready to fill. A perfect root-filling has not been found. One of the most scientific papers, to my mind, on the subject of root-filling, was read by a gentleman in the South, where he described a method of filling roots with paraffine, by the use of an electrode and metallic points. It pleased me because our object in filling a root is, if possible, to seal it hermetically, so that it shall not in the future become contaminated from within or without. You understand clearly the position taken by some in regard to porosity of the root. Remedies in the canal may pass out through the canaliculi, and, reasoning by analogy, if they can pass out, why can't they pass in? We do not discuss that subject, but if we can seal the canal perfectly, seal it hermetically, we are a step nearer to the desired point.

One of the beauties of this remedy, to my mind, is its easy removal. A good general always keeps his base of supply open, likewise his road of retreat, and so I think it is scientific for us to always leave a means of retreat; the more easily we can do that for the patient, the more scientific our treatment is, although such pre-

caution is a tacit acknowledgment that we are sometimes obliged to make a retreat.

The value of salol is not alone as a root filler; if it had been, I should have confined my paper to that subject; but, for the uses I have described, I think it is well worthy of experiment.

Dr. Bonwill.—Ever since the implantation of the roots of teeth I have been interested in that method, and have been experimenting in a parallel line. What I shall speak of is the feasibility of implanting metallic tubes into the alveolar process from three-eighths to half an inch in depth. The object of the appliance is to take the place of bridge-work.

He then exhibited a model that consisted of a tube into which was inserted a pin that could support a crown; the pin moved easily in and out of the tube.

JOSEPH HEAD, M.D., D.D.S.,

Editor Odontological Society of Pennsylvania.

Editorial.

WILL DENTISTRY BE ABSORBED BY MEDICINE?

THE influences which have been brought to bear upon dentistry to force it to become a specialty of medicine have been powerful and persistent, and in the end will doubtless conquer, and it will cease to be known as a distinct profession.

To the general mind this will not be a matter for regret. Indeed, it will doubtless be welcomed as the legitimate end of all the efforts of the past. While this is in a measure true, it is questionable whether the result will not be attained at the sacrifice of many, if not the majority, of the qualities that have made American dentistry worthy the name it has received.

The status of collegiate instruction in this country in the first period of the organization of dental colleges was necessarily crude and had very little of the character developed at a later stage. The instruction in those branches affiliating with medicine was of the most elementary character, and led to nothing further than a very thin veneer of medical science upon a somewhat disjointed mechanical training.

Further developments came very slowly; indeed, it may be said that for over twenty-five years the colleges, limited in number, were equally limited in resources and gave their students little or nothing worthy the name of medical science. The change that eventually came was in a rapid development, largely induced by organization and a higher appreciation of what a dentist should be to worthily practise.

This development of the scientific side of dental life superinduced a strenuous effort, on the part of many, to seek affiliation with medical men in some of their local organizations, resulting finally in the formation of a section of oral surgery in the National Medical Association and a similar branch in the International Medical Congress. Further than this there has been no advance, and these efforts cannot be regarded as having had any direct influence to bring about closer relations between medicine and dentistry.

While this is true and must ever be true of all forced efforts, it is undoubtedly the fact that the gradual advance of dental education along medical lines has been so rapid and so thorough that the young dentist of to-day who graduates from any one of our leading colleges is capable of standing side by side with his medical *confrère* without any loss of self-respect. This continued and increasing elevation of the standard can have but one result, the destruction of all discordant elements and the breaking down of long-standing prejudices.

What will be the effect of this change? It must be evident that the increased amount of time spent in the acquisition of the foundation sciences—physics, chemistry, anatomy, physiology, histology, pathology, materia medica, and therapeutics—must necessarily reduce the time formerly devoted to the mechanical with its ever-increasing problems in metal and rubber work, crown and bridge insertions, continuous gum and the higher work of orthodontia, or with operative dentistry so important to the best interests of the dentist and his patients.

The necessity for thoroughness in the practical side of a dentist's life seems to require that the dental schools should ever remain as they are distinctly organized for special work. So soon as they become absolutely merged into the medical will the practical part of a dental education suffer degeneration. The absolute absorption of the dental colleges by the medical should never for a moment be tolerated. Separation is the only defence dental education has against the weakness sure to follow any such intermingling.

Many good men in dentistry view this in a different light and hold to the idea that medical education must precede the dental; but experience has amply demonstrated that the adoption of this method of training very rarely results satisfactorily. The long course now required to complete medical studies unfits the student for mechanical details, and at the same time produces a distaste for that kind of work, and skill, except in very rare instances, is never acquired.

There is a growing disposition to place medical men at the head of dental colleges, and while this has not assumed large proportions, it is at present a menace to the well-being of dental schools. While the value and good services of those already connected in this way with dental education is recognized, their presence at the head of dental institutions must be regarded as a serious mistake, and it would seem the duty of the National Association of Dental Faculties to at least recommend to the colleges connected with it to abandon the practice. If this be not done the time is not far distant when dental colleges as distinct organizations will cease to be.

Dental training began by force of medical prejudice in separate dental schools. The utility of this has been amply demonstrated, and there seems no reason now why this course should be changed. Dental colleges are supposed to be paying institutions, and hence the desire to attach these to medical colleges, and while this is well and of mutual advantage, it will require careful guarding lest the great work which has cost so many years of labor be not destroyed in a generation.

Bibliography.

WORLD'S HISTORY AND REVIEW OF DENTISTRY. Edited, compiled, and revised by Herman Lennmalin, D.D.S., from the most reliable and authentic resources available at Chicago, Ill.

The title of this book fails to explain its exact character, for the contents, valuable as they are, are in no sense a history of dentistry throughout the world, neither is the book a review of that subject, but concerns itself principally with the laws enacted to govern dentistry in the various countries and States of the world.

The first part is devoted to dentistry in the United States, and

gives the rise and to some extent the progress of this profession from 1766 to 1820. This is, in the main, taken from "The History of Dental and Oral Science," and covers but eight pages.

This is followed by "The Dental Colleges of the United States," when and where organized, the "Dental Journals," "Statistics of the Number of Dentists by States Associations," and "Dental State Laws."

This latter portion, covering the States and Territories from Alabama to Wyoming, is the most valuable collection of the various laws since the lamented Rehfuess attempted to bring them together in his work on "Dental Jurisprudence." The collection seems to have been made with care, but a compilation, such as this, can never be perfect while the everlasting tinkering with dental laws continues in the several States.

From the one hundred and twenty-one pages devoted to these laws, the author carries his readers through those of Canada and its several provinces, Mexico, Central America, South America, and Surinam: the various countries of Europe, Turkey in Europe, Africa, Asia, Turkey in Asia, Australia, Sandwich Islands, New Zealand, etc.

The author is to be congratulated on the completion of a book which, if absolutely correct, will be the most valuable for reference in its special lines that has been recently issued from the dental press. This compilation has been the great want of college instructors, and in fact every one having to do with students of various countries. The author certainly seems to have exhausted every effort to make the book a reliable guide.

It may be procured of the S. S. White Dental Manufacturing Company, Wilmington Dental Manufacturing Company, H. D. Justi & Son, or of the author, Rockford, Ill. The cost is five dollars.

USEFUL HINTS FOR THE BUSY DENTIST. By William H. Steele, D.D.S. Wilmington Dental Manufacturing Company, Philadelphia, 1895.

This is a second edition of a very valuable publication. It was fully noticed in this journal in the first edition, and all that need be said now of this is that the author has improved in the good qualities of that by valuable additions. The author has adopted the safe plan of presenting "to the busy practical dentist the latest and best methods of our most skilled operators and best writers, arranged in such a manner as to be accessible at a moment's notice."

Illustrations have been employed where necessary to explain the text.

The book covers two hundred and ninety-eight pages of valuable matter, and must prove a most serviceable and convenient book of reference.

TRANSACTIONS OF THE MIDWINTER FAIR DENTAL CONGRESS, held in San Francisco, commencing June 11, 1894. San Francisco, 1895.

This comprises a full report of that meeting now passed into history, and has a distinct value for reference upon library shelves.

It contains some valuable papers and some of no great importance. This, however, is by no means peculiarly applicable to this Congress, but applies to all organizations, local and national.

The Proceedings are neatly arranged and are creditable to all concerned.

The labor connected with this Congress, devolving as it did upon the few, must have been enormous, and the devotion that carried it to a successful completion deserves and should receive unstinted praise from the dental profession throughout the country.

A photographic presentation of the members of the Congress covers the opening page. This, while not very clear, is an excellent reproduction of many faces made familiar to dentists everywhere.

TRANSACTIONS OF THE TWENTY-FIFTH ANNUAL SESSION OF THE SOUTHERN DENTAL ASSOCIATION, August 2 to 6, 1894, Hygeia Hotel, Old Point Comfort, Va. Wilmington Dental Manufacturing Company, Philadelphia, 1895.

TRANSACTIONS OF THE AMERICAN DENTAL ASSOCIATION AT THE THIRTY-THIRD AND THIRTY-FOURTH ANNUAL SESSIONS, held at Chicago, Ill., August 12, 1893, and Old Point Comfort, Va., August 7, 1894. S. S. White Dental Manufacturing Company, Philadelphia, 1895.

These two meetings, while held at the same place and with slight variation in time, were distinctly separate bodies. The transactions have, therefore, a value to be judged quite independently of association of time and place.

Both meetings were handicapped by atmospheric conditions, Old Point Comfort excelling itself in discomfort from heat. This had a noticeable effect upon the discussions. The papers were of the usual variety.

Obituary.

RESOLUTIONS ON THE DEATH OF DR. J. J. R. PATRICK.

RESOLUTIONS adopted by the Odontological Society of Chicago in reference to the death of Dr. J. J. R. Patrick, of Belleville, Ill.:

WHEREAS, Death has removed from our midst Dr. John J. R. Patrick, of Belleville, Illinois, and there has passed from the scenes of human activity a character whose labors have enriched the stores of science, a man who delved fearlessly and steadfastly into those mysteries of nature which call forth the most subtle energies of the human mind, and yield results making the lives of succeeding generations happier; now, therefore, be it

Resolved, That, in the death of Dr. Patrick the world loses an honored citizen-soldier, the field of science a conscientious, faithful laborer, and the dental profession a light whose extinguishment will kindle the profession's interest in the work he has accomplished for it, and thus extend and perpetuate his good influence. Be it further

Resolved, That to the family, friends, and professional associates of Dr. Patrick we extend the assurance that we appreciate his worth, and are grateful that his life had been spared until it nearly completed the allotted time of three-score and ten.

JAMES A. SWASEY,
ALISON W. HARLAN,
LOUIS OTTOFY,
Committee.

Notes and Comments.¹

A CAUTIONARY SIGNAL.—In the April number of the INTERNATIONAL DENTAL JOURNAL, under "Selections," was published Dr. J. R. Callahan's method of opening root-canals with sulphuric acid, which has brought forth the following note from Dr. F. A. Roy, New Orleans. He says, in part, "The Callahan method is being taken up by dentists everywhere and of all degrees of competence, so some may use it as an easy way to avoid careful work in tedious

¹ The assistant editor solicits contributions for this department,—new methods, new remedies and formulas, or any short practical note which may prove of value to the practitioner or student. Address 1718 Walnut Street, Philadelphia.

operations, despite the doctor's conservative statements. The cut shows a possibility even with careful manipulation, a certainty with careless work. This tooth was selected because the root ends appeared thickened and dense, with small canals. After persistent effort the broach found its way through the anterior root *via* the buccal canal, but not through the foramen B. The root was cut open to expose the lingual canal, which shows plainly that probably no broach, with or without acid, and certainly no drill, could be made to follow the canal.



"Then the posterior root was cut or drilled. H_2SO_4 cuts and really enables one to drill with a broach, and, as with any drill unless carefully handled, with possible action understood, we may be misled. See the result in this nearly straight root. The foramen is at A. The result in the anterior root is somewhat discouraging. Drilling with acid is not so much easier nor more sure in following canals than older methods. Not all crooked or obstructed canals may be opened in a few minutes, and the careless may manufacture canals in the alveolus."

SIMPLE METHOD OF CLEANING IMPRESSION TRAYS.—"Give the impression trays a coating of sweet oil with a woollen cloth dipped in the oil. Put them in strong soap-suds (made with soap shavings or powder), boil, and wipe dry. Now polish with whiting by using a soft woollen cloth or fine leather. In this way you can keep your trays bright and clean, and the plaster will not adhere to them."—E. B. EDGERS, D.D.S.

Current News.

AMERICAN DENTAL ASSOCIATION.

THE Thirty-fifth Annual Meeting of the American Dental Association will be held at Asbury Park, New Jersey, commencing Tuesday, August 6, 1895, and continuing for four days.

Railroad rates.—A rate of *a fare and one-third for the round trip*, upon the "certificate plan," has been secured. In order to get this reduction, full fare must be paid in going to the meeting, a *receipt* being obtained therefor from the ticket agent at the *starting-point*. If travelling over more than one line, secure a certificate over each line, or have the ticket agent at the starting-point name in the receipt the different roads over which the ticket is good. This receipt (certificate) must be countersigned by the Secretary of the Association, and entitles the holder to return for one-third fare. Arrangements have been made to have the joint agent of the railroads present at Asbury Park on Wednesday, August 7, and it is desirable that all who intend to attend the meeting shall be in attendance, so that their railroad certificates can be passed upon at that time. No rates have been granted over the lines comprised in the Western Passenger Association. Members residing west of Chicago should secure the best rates they can to the point where they enter the territory in which the reduced rate prevails.

J. N. CROUSE,

Chairman of the Executive Committee.

2231 PRAIRIE AVENUE, CHICAGO.

HARVARD DENTAL ALUMNI ASSOCIATION.

THE twenty-fourth annual banquet of the Harvard Dental Alumni Association was held at the "Thorndike," in Boston, on June 24, 1895, with sixty-three members and guests present. The invited guests were Charles Francis Adams, LL.D.; Hon. Sherman Hoar, United States District Attorney; M. C. Ayres, editor *Boston Advertiser*; Rev. A. E. Winship, editor *Journal of Education*; Victor J. Loring, LL.B., and William M. Conant, M.D., Instructor in Anatomy, Harvard Medical School, all of Boston.

Drs. Charles H. Abbot, '85, and Amos I. Hadley, '91, of Berlin, Germany, Corresponding Secretaries, were present.

The post-prandial exercises were inaugurated by President Dwight M. Clapp in reading a communication from Professor Charles A. Brackett, '73, of Newport, R. I., to the Association, expressing "appreciation of the services of Professor Thomas H. Chandler, Dean of the Dental School, sorrow for his continued illness, and earnest good wishes for his speedy restoration to health." In the form of a resolution it was unanimously adopted, and a copy transmitted to Dr. Chandler.

President Clapp happily introduced the guests, all of those who had accepted invitations being present, and each improved the opportunity to do himself credit by making an excellent speech.

Hon. Sherman Hoar, after much wit, claimed the right for all the professional schools of Harvard University to vote for overseers, saying, "Now, Harvard College controls Harvard University, but Harvard University ought to control Harvard University."

In the absence of Dean Chandler, Professor Thomas Fillebrown described the work and progress of the school during the year past, stating that the entrance examination in '97 would make either Latin or French obligatory, in addition to the present requirements.

The reports of the various officers were made, and the Association elected the following-named officers for the ensuing year:

President, James Shepherd, D.M.D., '85; Vice-President, Frank Perrin, D.M.D., '77; Secretary, Waldo E. Boardman, D.M.D., '86; Treasurer, Washburn E. Page, D.M.D., '77.

Executive Committee.—Waldo E. Boardman, D.M.D., '86, chairman; William P. Cooke, D.M.D., '81; Patrick W. Moriarty, D.M.D., '89.

WALDO E. BOARDMAN, D.M.D., '86,

Secretary.

Boston, July 10, 1895.

WOMAN'S DENTAL ASSOCIATION.

THE Woman's Dental Association met at Dr. Stilwell's office, 1300 Arch Street, May 4, 1895, the President, Dr. Anna Y. Focht, in the chair.

Fannie E. Hoopes, M.D., D.D.S., of Baltimore, was essayist. Subject, "Oral Conditions in Relation to Gastric Diseases." Discussion by all the members present, and by our visitor, Dr. C. N. Peirce.

EMILY W. WYETH,

Recording Secretary.

3920 FAIRMOUNT AVENUE, PHILADELPHIA, PA.

ILLINOIS STATE DENTAL SOCIETY.

THE Thirty first Annual Meeting of the Illinois State Dental Society was held at Galesburg, May 14 to 17, 1895. About two thousand were in attendance. The following-named persons were

elected officers for the ensuing year: President, Walter A. Stevens of Chicago; Vice-President, C. R. Taylor, of Streator; Secretary, Louis Ottofy, of Chicago; Treasurer, Edgar D. Swain, of Chicago; Librarian, J. R. Rayburn, of Fairbury; Chairman of Executive Committee, W. A. Johnston, of Peoria. The next meeting will be held at Springfield, May 12 to 15, 1896.

LOUIS OTTOFY,
Secretary.

MASONIC TEMPLE, CHICAGO.

ALUMNI ASSOCIATION, UNIVERSITY OF MICHIGAN.

THERE will be a meeting of the Alumni Association of the University of Michigan, Dental Department, at Asbury Park, same time as American Dental Association, August 7, 8, and 9, 1895.

L. L. BARBER,
Secretary.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

AT the meeting of the Dental Society of the State of New York held May 8 and 9, 1895, the following officers for the ensuing year were elected: President, Dr. H. J. Burkhart, Batavia; Vice President, Dr. C. K. Van Vleck, Hudson; Secretary, Dr. C. S. Butler, Buffalo; Treasurer, Dr. John I. Hart, New York; Correspondent, Dr. R. Ottolengui, New York.

THE International Dental Journal.

VOL. XVI.

SEPTEMBER, 1895.

No. 9.

Original Communications.¹

WHICH METHOD OF ROOT-CANAL FILLING WILL COMPLETELY OBLITERATE SPACE?²

BY SAFFORD G. PERRY, D.D.S., NEW YORK.

IN the half of the evening allotted to me there is not time for a full consideration of the different methods employed in filling the root-canals of the teeth, and I may as well proceed at once to describe the one that I believe to be the best, and the one I have adopted after many years' close study of the whole subject.

Before I can do that intelligently, however, it will be necessary to consider at some length the matter of the approach to the roots that are to be cleaned and filled. The methods I employ for the most part require openings to be made through the teeth directly over the roots in a line with their long axis, so that their canals can be entered with nearly straight instruments. The methods of cleaning and filling the canals, which will be described later, will show this to be an almost indispensable condition. If the cavities of decay do not allow this fairly direct approach, then tap-holes are to be drilled through the tooth, so that the roots can be entered in a nearly straight line. Leaving all cavities out of the question,

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the New York Odontological Society, April 16, 1895.

and first considering sound teeth that are dead and have to be opened, we have then only to regard the fissures in the crowns, and to remember the anatomy of the roots, in order to know exactly where to drill. No mention need be made of the superior and inferior incisors, further than to say that, as a matter of course, they are to be drilled on their lingual sides, and at such angles as will give access to their canals in nearly a straight line. The first inferior bicuspid must be drilled through the small anterior crown fissure; the second bicuspid through the anterior division of its single irregular fissure. The first lower molar, not through the deep fissure near the middle of the crown, but just anteriorly to it, so that the tap-hole will come nearly over the anterior root. The tap-hole should then be reamed posteriorly to give access to the posterior root. The backward slant of this root is such that nothing more is needed to give direct access to its canal.

Then, substituting a right-angle hand-piece, the same tap-hole should be reamed towards the buccal and the lingual sides of the tooth, and this will open up the two canals in the anterior root, so that nearly straight instruments can be passed to their extremities. The inferior second molar should be entered just anteriorly of the deep middle fissure, so that the anterior root can be entered in nearly a straight line. A little reaming posteriorly will give access to the posterior root, as in the case of the first molar. The inferior wisdom tooth should be entered, also, just a trifle in front of the centre of the crown. The superior first bicuspid should be entered through the anterior depression of the fissure. This will give direct access to the two roots, if they exist. The second superior bicuspid, of course, through the fissure in the centre of the crown. The superior first molar should be entered through the anterior deep fissure, and the tap-hole reamed towards the palatine and buccal roots. The superior second molar should be entered through the anterior fissure in the same way. The superior wisdom-tooth should be entered from the anterior edge of its irregular fissure. The sizes of these tap-holes must vary with the different teeth. They must be as small as possible, in order not to weaken the teeth; but, on the other hand, they must be large enough to allow the entrance of light, and to give a chance for accurate work.

One naturally shrinks from drilling a hole in a sound tooth, but it is a necessary means to an end, and the patient had better have a weakened tooth with healthful roots than diseased roots and a sound, strong tooth.

Thus far I have assumed the absence of cavities. If they occur in the centre of the crowns, or on the anterior approximal surfaces of the molars and bicuspid of either jaw, tap holes may not be necessary; but if they occur on the posterior approximal surfaces of these teeth, and are not very large, tap-holes are indispensable. If they are not considered so for the use of the instruments generally employed for cleaning and filling the roots, they certainly are for the use of the instruments I shall describe. A large cavity in the posterior surface of a lower molar may give direct access to the posterior root. In that event the tap-hole can be drilled more directly over the anterior roots. In such cases I have many times drilled two small holes over the front root, one over each canal, throwing the light by reflection through the cavity of decay. In the same manner a large cavity on the posterior surface of the superior molar may give direct access to the palatine root, and two tap-holes, one over each of the buccal roots, will give direct access to their canals. Often the tooth substance between these two tap-holes can be cut away with a fissure-bur, leaving a slot through which work is facilitated, and without much weakening of the tooth. This slot will be nearly half-way between the bottom of the deep fissure and the tips of the buccal cusps. In this case, also, light by reflection can be afforded through the cavity of decay, and the tap-holes can be very small and the slot very narrow.

If these large cavities on the posterior surfaces of molars do not quite give direct access to the posterior or palatine roots, a fissure-bur readily cuts a groove in the grinding-surface edge of the cavity, and a tapered root-canal reamer, revolved on the posterior side of the opening into the canals, opens up the root so that a straight broach wrapped with cotton can be rotated in it, and this rotation may be essential to its thorough cleansing. The reamers used for this purpose are those I presented before this Society several years ago. They are never used, except for opening the orifices of root-canals. They have a very gradual taper, so that no shoulder or irregularity of surface is left, as often occurs with the reamers generally in use. Cutting, as they do, on their sides, they are very dangerous instruments to use deep in the roots, and their use is therefore restricted to opening the orifices of the canals. And here let me say that I never use any of the means employed for enlarging the canals, except at their orifices, as described.

The roots of teeth are often very crooked, and some are very flat and thin, and an immense number of valuable teeth have been

lost by heroic drilling through their sides. An untouched canal is always smooth, and, though curved, its extremities can almost invariably be reached with the proper instruments.

I will not say that I never use a fine barbed broach for the removal of freshly-devitalized pulps, but I will say that I seldom use them, even for that purpose, and I do not use them in any canal in which a pulp has been for some time dead. In their place I use the well-known Swiss broaches, made for watch-makers, and which can be found at any of the places where jewellers get their supplies. They are four-sided, and highly polished and spring-tempered. I place a dozen or two of them in a glass tube, and draw the temper to a deep blue, over an alcohol lamp or a Bunsen burner. The glass protects them from currents of cold air, allows them to cool slowly, and enables one to see the color of the steel. On these tempered instruments shreds of cotton or raw silk can be lightly or loosely rolled, so that it can be withdrawn from the root of a tooth, or left in it, as desired. If tightly rolled, it can be entangled in a devitalized pulp in such a way that the whole pulp can be removed with considerable precision. The silk or cotton, though very tightly rolled, is yet easily removed from the instrument by laying it between the folds of a napkin and pulling it off with the thumb and finger. If it has been used in a root long dead, the fingers can be protected from the bad odor of the cotton or silk by the use of a piece of rubber dam placed outside of the napkin.

There are many advantages in the use of this instrument in all the root-canal operations. In the first place, the fact that the broach is square makes it possible to roll the silk or cotton upon it with any degree of looseness or firmness in an instant of time. This, of course, cannot be done with a round, smooth broach. Having no barbs, the cotton or silk is equally quickly removed between the thumb and finger. Also, having no barbs, there are no weak places along its whole length, and it does not readily break. Every barbed instrument is weakened at the base of every barb; even a cross-scratch on any round instrument determines the place where it will break, if it break at all. If the barbed instruments do not break off entirely, the barbs almost invariably do, and in the canals, from which they cannot be removed. Besides, the barbs increase the diameter of the instrument, and it is no wonder that it is generally accepted that the fine canals of the anterior root of the first lower molar and the buccal roots of the superior molars cannot be entered to their extremities.

Swiss broaches can be procured that are almost hair-like in size,

and their diameter is but slightly increased by a few fibres of silk or cotton, and they can be carried almost invariably to the end of every root-canal.

Charged with carbolic acid and used with patience, the living fibrils of pulp in a minute canal can be cauterized and destroyed, and in a blackened and disintegrated form can be removed little by little. It takes time, but finally the end of the root will be reached, and after the use of a great many rolls of silk it will finally come out of the canal, white and dry and clean. Or, if the root has been long dead, the same persistent effort will bring it out clean and comparatively odorless. By rotation of the instrument the contents of the canal become entangled in the silk and are removed. This rotation of the instrument is very essential, and now it can be seen why it is so necessary to open the teeth in such a way that a straight instrument can be used. These slender instruments can be employed in a wonderful way if they are kept straight, but they become unmanageable if they are bent.

For places where a stiff instrument is needed, I have points made from untempered piano-wire, but filed square, so that the cotton can be rolled on them in the same ready way. They are tapered like a trout-rod. They are stiff near the shank, and are therefore very manageable, and can be bent to enter a canal where direct access to it cannot be easily had.

The method by which these points are fastened to the handles originated with Dr. Darby. They are soldered to a little shank, and that is threaded and screwed into the socket-handle. In this way they are held firmly. This is a little thing, but it has been of great value to me.

For holding the Swiss broaches I have little handles turned from rosewood. They are tapered to a small diameter at the end, held by the thumb and finger. This is to facilitate rolling the cotton on the instrument. Of course, the smaller the diameter the faster it rolls. In the end that holds the instrument a hole is drilled, and the instrument, with a few fibres of cotton rolled on it, is easily fitted, and easily removed if it becomes broken. Into the end of the large handles that hold the stiff instruments a little wire is driven, which, held between the thumb and finger, enables one to rotate the instrument rapidly in rolling the silk or cotton on the point.

I have taken all this time to describe these instruments minutely because their use leads up to, and gives the key to the method I employ in filling the roots.

There may be nothing new to say on the subject of filling root-canals of good size. The posterior roots of lower molars, the palatine roots of superior molars, and the roots of the bicuspid and of the incisors, are probably filled by most operators either with chloro-percha, followed with the gutta-percha points, or with oxychloride, followed by the same points, in a manner that may be proof against the most searching criticism. These gutta-percha points originated in my office, and I have watched the headway they have made, naturally, perhaps, with considerable interest. They were suggested to me years ago by the use of the delicate paper points for drying the canals, described before this Society in a paper called "Offerings," by Dr. J. F. P. Hodson.

I think it will be generally admitted that the anterior roots of lower molars, and the buccal roots of superior molars, and very minute canals in general, have not only not been accurately filled, but have not always even had their pulps completely destroyed and removed, and in old, dead teeth they have not always been cleaned. I will not go so far as to say that with the delicate Swiss broaches, in the way described, it is possible to get to the end of all these inaccessible canals, but I will state that it is a practical thing to do so in almost every case. It is not only possible to get the canals clean, but it is also possible to fill them with a considerable degree of accuracy. If the hair-like broach, which is used for cleaning one of these fine canals, were wrapped with silk or cotton, and that charged with oxychloride or with chloro-percha, and then carried down to the closed end of the root (and these fine canals are always practically closed), and it could be left there, no one could deny that the canal must be filled with all the accuracy that could be expected in any root-filling. But, of course, the steel wire would not be permissible. When it is removed a space is left. Some of the chloro-percha or oxychloride may remain. We may repeat this process, and still there will be the same result.

Let us not deceive ourselves by believing that into such a minute hole, closed at one end and full of air, we can pump either of the materials named in such a way as to obliterate all space. With a minute opening at the end of the root for the escape of the air, it might be done, but in the roots of teeth in the mouth it is an impossibility. If we wrap the fibres of silk or cotton loosely so that they slip off the instrument and remain, still there is the space left by the instrument when it is removed. The only way is to leave the instrument itself. This result I accomplish by substituting gold or platinum wire, in the following manner:

The end of a piece of gold wire, smaller than the diameter of the canal to be filled, is bent over on itself with the pliers, and crimped to a uniform size in a fine groove in the beaks of the pliers. The length of the portion bent over is not more than the diameter of an ordinary pin. This is done in order to get a better hold of the wire if it ever needs to be removed from the root. In attempting to pull it out, if it does not come, but straightens out, there is then wire enough to get hold of with suitably made pliers. This doubled end of the wire is then fastened in a delicate pin-vice made for the purpose.

The depth of the canal having been measured by slipping on the Swiss broach one of the little rubber disks cut from the rubber dam by the Ainsworth punch, the wire is cut to the right length, and then, being firmly held by the pin-vice, is filed square to a tapering point by a very fine file. On this wire a half-dozen or a dozen fibres of silk or cotton are rolled exactly as is done on the Swiss broach. This is then transferred from the pin-vice to a plugger-point, into the end of which a hole is drilled, large enough to receive the doubled end of the gold wire. The fit is close enough to hold, and yet so loose that, when the gold wire has been put to its place in the root, the plugger slips off and leaves it in place.

This gold wire, while held in the plugger-point, is dipped in chloro-percha or oxychloride of zinc and put at once to its place in the root, the canal having just been swabbed with a cotton-wrapped Swiss broach, wet with a very thin solution of the chloro-percha or the oxychloride, as the case may be. When this gold wire is carried to its place it is certain that the root is filled to its extremity as perfectly as it may ever be. The plugger is of soft steel, so that, in a moment, it can be bent at any angle.

In this manner it is possible to fill these canals through a comparatively small tap-hole. This operation requires nice manipulation (there is none in dentistry that requires nicer); but it can be done, and exactly as described here.

If it is not admitted that these minute roots can be accurately filled in this way, I think it must be believed that they can be cleaned and sterilized in the manner described, and that is a clean gain, and, by some, may be considered sufficient; for many believe that if the apical end is closed the roots may safely go unfilled. I do not admit this, but I do believe the thorough cleaning and sterilization of any closed root is more important than its perfect filling.

The objective point in all root-filling is the apical end of the canal. I believe this can be reached with unerring certainty by no other means than by a wire in some form. When this is well filled, the rest of the canal may be poorly filled, and yet the tooth will do well. In general practice I think this end is poorly filled, and the accessible part of the canal is well filled. I am ready to make the assertion that the roots of any tooth freshly devitalized and filled in this way will never give trouble. It is an impossibility if it is accompanied with thorough sterilization. Of course, I would not make any such claim for any tooth that had been dead for some time before the treatment was applied. Dead roots, in which and about which septic influences have been at work, must always remain somewhat uncertain.

You will notice that I have given attention thus far only to very minute canals. There is not time now to say more than a word about the filling of canals of larger size. In fact, there is not very much to say if I had more time. In the early days it was my habit, as it was the habit of most practitioners, I think, to use chloride of zinc, carried to the apex on a shred of cotton, the cotton being left in the root. After hitting upon the idea of gutta-percha points plunged cold into a canal wet with chloro-percha, I used them generally for many years.

For large canals, and those open at the apical ends, I used pointed gold wire dipped in chloro-percha, or barbed and warmed, and wrapped with red gutta-percha, not exactly as described long since by Dr. Morrison, but nearly so.

A few years ago Dr. Howe called the attention of this Society to the fact that gutta-percha is a neutral substance, and, besides having no antiseptic action, is capable of absorption, as shown by the disagreeable odor arising from it when removed from a root-canal and warmed over the flame of a lamp, as well as from its tendency to expand. In fact, this warming is not necessary to demonstrate the fact stated. I recognized the truth of this, and from that time I preceded the gutta-percha points in closed roots with chloride of zinc, plunging the cold, stiff points through this creamy substance, and then filling the root-chamber with it. When these points are surrounded by an envelope of oxychloride of zinc, I think the root remains sterilized, and that this combination makes almost an ideal root-filling. It has the advantage of comparatively easy removal, and that, I think, is an important consideration.

If the canals are only of medium size, and there is danger that

the points will be doubled up and not carried through the oxychloride to the apex, then I use gold wire in the manner already described, but wire, of course, of larger size.

If the canals are open at the apex, I use gold wire wrapped with a few shreds of silk and dipped in chloro-percha, and pushed to the apex by exact measurement. If the canals and the opening at the apex are very large, then I use gold wire barbed and wrapped with red gutta-percha, putting it in and taking it out several times to get a sort of impression of the canal, and thus being able to judge a little better of the amount to use, and putting it in finally by exact measurement.

All these gold wires have provision made for their removal, the large one having a notch filed near the end in which an instrument can be engaged, and the little ones being bent double near the end.

Where chloro-percha is used they are all easily removed. They can also be removed where oxychloride is used if they fit the root well, so that only a thin covering of oxychloride exists. But they cannot easily be removed if they are much smaller than the diameter of the canal, so that they are embedded in a thick mass of the oxyphosphite.

Although I make this provision for the removal of these fillings, for it is easily done, yet I never expect to have to do it in any freshly devitalized tooth where I have had the full control of the operation of removing the pulp and filling the root. But with teeth long dead I have no such feeling of security. Such teeth are favorable ones for the use of wax or paraffine, and particularly for a canal paste perfected by Dr. Lord, and used by him for many years. It was used by Dr. Bronson, and since by Dr. Van Woert, and was spoken of very highly by him before this Society. This latter should commend itself to our attention, as it has the great advantage of being easily removed. It is composed of iodol, zinc oxide, carbolated vaseline, and a little oil of cinnamon.

Gold wires are particularly suitable for the successful use of either of these materials.

I cannot close without a further word in reference to oxychloride of zinc. It has been long before the profession, and has probably been more used, skilfully and unskilfully, for root-fillings than any substance known, and it continues to occupy a prominent place to-day as in the past. My own belief is that the good results arising from its use are due mainly to its antiseptic properties. But I consider it a dangerous material to use in roots, the apical

ends of which are open. It must be said that it is not altogether easy of removal, and that should lead us to search still further for the more perfect filling. For the large pulp-chamber and as a foundation for the outer filling it is unsurpassed.

SYPHILIS, WITH SPECIAL REFERENCE TO THE RELATIONS OF THE DENTAL PROFESSION TO THE DISEASE.¹

BY HENRY A. PULSFORD, M.D.

MANY, if not most, of those present here this evening would probably assert quite confidently that they have never had a syphilitic patient in their operating-chairs. Yet I venture to state that there are very few busy dentists who do not unwittingly treat at least one syphilitic in the course of each year of practice. The disease is an extremely common one. In the practise of skin-specialists about one-tenth of all the cases seen are forms of syphilis, and in order of frequency it stands third upon the list of skin-diseases. As it is contracted by the rich and intelligent almost as often as by the poor and ignorant, you are always liable, no matter among what class you practise, to be called upon to treat some person who carries in his mouth the poison of the disease. If he happen to infect you, it means at the very least two years' abstinence from professional work, to say nothing of the social and domestic privations such as infection necessarily imposes. If, through you or your instruments, he infect one or more of your patients, it means great and possibly irreparable injury to you and to your practice. It should therefore be of the utmost interest to you as dentists to have accurate information about this disease; and it is in the hope of adding to your stock of knowledge of the subject that I venture to present this paper to-night.

Syphilis is a chronic infectious disease, produced by a specific poison, which, in all probability, is a bacillus closely resembling that of tuberculosis. Inoculation with this virus causes a speedy saturation of the whole system with the disease, and, except for the transient local reaction at the site of the inoculation, the malady in its subsequent course shows all the characteristics of a general, constitutional disease.

¹ Read before the Central Dental Association of Northern New Jersey, June 10, 1895.

Syphilis may be acquired in several different ways: The germs may be deposited upon an abrasion, wound, or other solution of continuity of skin or mucous membrane. In the case of a woman impregnated by a syphilitic, they may enter the system through the placental circulation. The child begotten by a syphilitic father is usually syphilitic, and a syphilitic mother generally brings into the world an infant who inherits her disease.

The germs of syphilis are present in the discharges from all the early eruptions and ulcerations, and in the blood, lymph, semen, and ova of those passing through an active stage of the disease. Infection through the unbroken epidermis, either of the skin or mucous membrane, is impossible. "The venereal disease" *par excellence*, syphilis, is usually acquired during sexual intercourse. Liability to the disease is practically universal, the only known immunity being that conferred by the disease itself, which protects the individual against a second attack. Very few prostitutes escape it, the majority of them being infected in the course of the first two years of their loose life. Hence it is most frequent where prostitution is rife, or where promiscuous sexual relations prevail.

After the expiration of a more or less definite period of incubation, infection with syphilis is followed by the development, at the site of the inoculation, of the "initial lesion" of the disease. This is first seen usually as a hard, painless papule, which soon breaks down into a shallow ulcer, secreting a scanty discharge, and causing considerable induration of the surrounding tissues. Such are the typical characteristics of the dreaded "hard chancre." The formation of this apparently trifling ulcer is a sign that the whole system is already hopelessly infected, and no local treatment, however heroic, can prevent the further development of the disease. Coincident with the appearance of this ulcer occurs the enlargement of the neighboring lymphatic glands, and within a short time a similar condition of all the glands of the body, together with the establishment of certain moderate constitutional symptoms, furnishes abundant proofs that the disease has indeed become general.

The eruptive period of syphilis follows the appearance of the initial lesion in from three to twelve weeks. It is ushered in by moderate fever, headache, pains in the joints and bones, and much general malaise. These symptoms are immediately followed by the appearance of an eruption occurring usually simultaneously on the skin and mucous membranes. The first eruption is commonly very superficial, consisting of spots of localized hyperæmia, like those of measles. It soon fades away, to be followed in the course of a few

weeks by a second eruption, generally of a papular form. This in turn disappears, giving place, in a longer or shorter time, to still another and severer form of eruption. Thus the disease goes on, gathering strength as it develops, until the climax of the eruptive period is reached in a general eruption of pustules or boils, which may be so severe that small-pox, as its name implies, is trifling in comparison.

In the course of the eruptive period, which often lasts two or three years, there also occur many other manifestations of the disease. The general health fails, there is anaemia and loss of flesh and strength, there are ulcerations of the various mucous membranes, the hair falls out, certain diseased conditions of the eyes and ears may develop, and the bones and joints may become affected.

After the second or third year there is often a decided lull in this storm of symptoms. Sooner or later, however, the disease again makes its presence and power felt by new and severer manifestations. These, the so-called *tertiary* or *late* lesions of syphilis, differ decidedly from those which occur in the eruptive stage. They are rarely general in distribution, being confined to a limited portion of the body; they are extremely chronic, each distinct attack lasting for months or years; they often spread slowly, in a serpiginous manner, from the point at which they start; they rarely secrete infectious discharges; they often cause extensive destruction of tissue, which, occurring in important organs, may occasion a fatal issue; they are more likely to attack deep-seated structures and vital organs than are the lesions of the eruptive period.

Fortunately for the many persons who contract syphilis, it is no more necessary for them to experience all the possible lesions of the disease than it is for a guest at a fashionable hotel to partake of every delicacy on the bill of fare. The majority of syphilitics have, besides their chancre, two or three moderately severe eruptions, a partial loss of hair, several ulcerations in the mouth or throat, and one of the slight or moderately severe late lesions. When properly treated from the first, the disease usually runs a rapid and benign course, leaving its victim somewhat impaired in health, to be sure, but only exceptionally a physical wreck or chronic invalid.

The foregoing brief sketch will give you some idea of syphilis as it is seen by physicians. Dentists, in the practice of their profession, naturally see much less of the disease; but that they have occasional opportunities for observing many of its characteristic lesions there can be no question. On the lips they may possibly see the initial lesion; for, although of rare occurrence, chancre of the

lip is the most common of all extragenital chancres. More rarely still they may meet with a chancre of the tongue, of the tonsil, or of some part of the face. The characteristics of all these lesions are similar in whatever locality they occur. The ulcer may be as small as that of the ordinary chapped lip, or it may be as large as an inch in diameter. The most constant characteristics of the syphilitic chancre are the parchment like induration of the underlying tissues and the painless enlargement of the nearest lymphatic glands.

In the eruptive period the dentist may see such of the eruptions as occur on the head and neck, the ulcerations and eruptions in the mouth and nose, and the diseases of the eyes. One of the most typical of the facial eruptions is the so-called "corona veneris," a well-marked semicircle of large papules crowning the forehead just below the line of the hair. The presence of this eruption, with a decided thinning of the hair on the sides of the head, is pretty strong proof of syphilis. Another characteristic manifestation of syphilis which a dentist may see is the "angina syphilitica," or syphilitic sore throat. It is a vivid, raw, ham-colored hyperæmia of the pharynx, tonsils, and soft palate, which is limited by a definite margin, especially well marked just above the uvula and the free border of the soft palate. Portions of the inflamed areas may be coated with a grayish layer of dead epidermis, or even superficially ulcerated. The most common locations for the oral ulcerations of this stage of the disease are the angles of the lips and the tip and margins of the tongue. Associated with these ulcerations, or occurring independently of them, may often be seen red spots, generally circular in shape, having sharply-defined edges, and flecked with a grayish deposit of epidermis. All syphilitic lesions of the mouth seem more apt to occur upon parts subject to continual irritation, such as that produced by a cigar or pipe, by a plate for artificial teeth, or by the roughened edges of broken or carious teeth. Clean and well-kept mouths are less liable to these complications than are foul and neglected ones.

The most common oral lesions of late syphilis are perforations and destruction of the hard and soft palates. They are almost always accompanied by a very offensive nasal catarrh. Deep ulcerations of the tongue and tonsils may also occur in this stage. It is always satisfactory to remember that the discharges from all these destructive ulcerations are usually quite harmless, and incapable of producing the disease in another person.

Not the least of the dangers of syphilis are the diagnostic diffi-

culties which it offers even to the experienced physician. If it were possible to give you an infallible rule by which you might detect the presence of the disease, it would, as far as you are concerned, be robbed of many of its perils. Unfortunately, however, there is no such rule. The most innocent-looking lesions sometimes prove to be syphilitic, and the most suspicious in appearance frequently turn out to be harmless. Even physicians who are familiar not only with syphilis, but also with the many diseased conditions with which it may be confused, are occasionally mistaken in their diagnoses and misled by appearances. Therefore, as a dentist is not necessarily an experienced syphilographer, he will scarcely attempt to make his own diagnosis of an unusual oral condition, but will in all such cases get the opinion of a competent physician.

A dentist finding himself face to face with a syphilitic patient who needs dental treatment has two courses open to him: he may refuse to take the case, either setting him adrift or turning him over to a less fastidious colleague, or he may accept and treat him just as he would any other case that comes to him. Now, I have neither the desire nor the presumption to lay down the law as to the conduct of the members of your profession, either under these or any other circumstances. I hold that every man, whether he be a dentist or a physician, has a perfect right to use his own judgment as to what cases he ought to treat and what cases he ought not to treat. That is his business. You can scarcely accuse me of meddling interference, however, if I merely place before you fairly and squarely the *pros* and *cons* of this matter.

In the first place, you may urge that you are justified in refusing to treat syphilitics simply and solely on account of the personal risk incurred. That is perfectly true, and the argument is unanswerable. But it is well to bear in mind that you do not avoid this risk altogether by refusing to treat such persons as you know are syphilitic. As a class, syphilitics need a great deal of dental treatment, and they generally contrive to get it sooner or later. Some do so innocently, being ignorant of the nature of their disease and of the risk they are imposing upon the dentist. Others are aware that they have syphilis, but do not know that they have infecting lesions in their mouths. Still others know all about their condition and its dangers, but do not care how much injury they inflict upon their fellows; they will shamelessly lie about themselves, and, in order to hoodwink the dentist, will try to mitigate and conceal their symptoms, as prostitutes do when syphilis threatens to ruin their business. It is thus quite evident that a dentist escapes only a part of

the risk of infection by refusing to treat cases which he knows are syphilitic; for in the recognized cases of the disease he can, by taking proper precautions, easily avoid infection; but where he does not suspect it he will naturally be more or less off his guard.

That a dentist ought to refuse to treat syphilitics from fear of infecting other patients is a good pretext, but can hardly be made a substantial ground for argument; for, as I have already said, in speaking of the personal risk, so also may I say of the risk to your patients, that it cannot be altogether avoided by refusing such cases. In the second place, in these days of wide and growing knowledge of germs and germ-diseases, when we all know that the mouth is a perfect hot-bed of bacteria, a dentist is surely not guiltless if he fail to take the simple precautions which will make it almost impossible for him to carry any germs whatsoever from the mouth of one patient to that of another. A dentist who always thoroughly cleanses his hands and sterilizes his instruments before working upon each patient runs very little danger of transmitting syphilis or any other infectious disease. I will not deny, however, that it would be the part of wisdom for dentists who knowingly do much work among syphilitics to have, as many physicians have, a set of instruments for use only upon such cases.

A third argument which I have heard urged against the treatment of syphilitics is the "social-morality" argument. Some "good" people argue that, as syphilis is invariably contracted through gross immorality, it is the duty of every true Christian, whether he be dentist, doctor, or preacher, to prevent the wretched sufferer from obtaining the slightest comfort or relief under this visitation of a justly incensed Providence. Of course, you all know that this is nonsense. A syphilitic is very rarely a more grossly wicked man than the majority of his fellows, unless he has been made to feel that he is a social outcast. I have known young men who acquired the disease in their very first step aside from the path of virtue; I have known good women—wives and mothers—who have been infected by vicious husbands; and every one of you know men who, in spite of long lives of licentiousness, have escaped this scourge.

We of the healing professions will do well if we let theology and casuistry alone. It is not our business to punish men and women for doing evil, but, as far as in us lies, to cure and to prevent disease. Even if we should all unite in refusing to treat these troubles, we should not only fail to advance the standard of social morality, but would inflict untold suffering upon countless innocent persons. There is too much syphilis, too much gonorrhœa in the world.

These maladies are not weeding out the vicious from society; their prevalence is not improving the human race; on the contrary, it is making it worse. Constitutions are undermined, individuals are weakened physically, mentally, and morally, and their offsprings are weaklings, unable to resist either disease or temptations. Let the clergy do their part in preaching sexual purity to the people; but let us also do our part, which is the curing of these diseases and the stamping them out of existence. With reference to venereal diseases, it always has been and always will be my practice to make treatment and relief as easy and as accessible as possible for all the afflicted. I do this not from any feeling of weak sentimentality for the sufferers, but for the benefit of humanity at large. Every syphilitic is a centre of infection, and carries with him the possibilities of infinite mischief to his fellows. If our laws permitted it, we should do well to incarcerate such persons, and subject them to proper isolation and treatment until they were cured; but as we are too fond of what we call "personal liberty" to do this, let us at least do our best to cure them,—and that, too, as speedily as may be.

In the scientific treatment of syphilis the dentist may, if he will, play a very helpful part. If all things were done as they should be done, the first step in the treatment of a syphilitic would be to send him to a dentist to have his teeth and mouth put in as good a condition as possible. This can in most cases be done before there are any infectious lesions in the mouth. Then, when the physician comes to put his patient through the courses of mercurial treatment, which are so essential to a thorough cure, there will be little danger of the occurrence of salivation or stomatitis, which check treatment, and make the remedy seem as bad as the disease. When the ulcerations attack the mucous membranes, there will be no severe lesions in the mouth from carious, jagged teeth. In short, if a syphilitic has a mouth filled with smooth, clean, healthy teeth, it is easy to cure him; but if his teeth are dirty, ragged, and carious, his cure is always difficult, and sometimes impossible.

If dentists as a class refuse to do their small but important part in the treatment of syphilis, they are working against those who are trying to exterminate this horrible disease. If they wish to help us who are doing our best to rid society of this scourge, they will put to one side all thought of personal risk, and, confident in their knowledge and skill, will cheerfully undertake and accomplish their share in the good work.

REPLY TO DR. W. H. TRUEMAN.¹

BY DR. I. NORMAN BROOMELL, PHILADELPHIA.

MR. CHAIRMAN,—I ask a few minutes of your time in which to make a short reply to Dr. William H. Trueman's paper published in the December number of the *INTERNATIONAL DENTAL JOURNAL*, p. 761. In his address the doctor took occasion to refer several times to a recent article read by myself before this Society (*INTERNATIONAL DENTAL JOURNAL*, October, 1894, p. 620). As the paper which he criticises so emphatically originated in this Society, it would seem eminently proper for me to produce my reply here. I was extremely gratified when I found that Dr. Trueman had considered my article worthy of his notice. Criticisms from such an eminent professional brother are both to be respected and desired. Criticisms upon any subject will always give to it life and vigor, and it is by these interchanges of opinions that we prosper.

The subject of Dr. Trueman's paper compels me to believe that he intentionally or otherwise misconstrues the meaning of my article. Throughout his essay he strongly endeavors to have his hearers believe that I would have vulcanite rubber banished from the dental laboratory. This was not my meaning, and I expressed my ideas clearly and concisely when I said that it was not the use so much as the abuse of rubber that is working the damage. I can plainly see how the first paragraph of my paper might suggest to Dr. Trueman the question which he has used as a title to his article. The question, which he has both asked and answered,—“Is prosthetic dentistry lagging? No,”—was prompted by my assertion that while there had been great advances in all operations upon the natural teeth, there had not been a corresponding progress in prosthetic dentistry. The gentleman wanders far from his text, treating the whole subject as though I had said that prosthetic dentistry is retrograding. I am free to admit the wonderful advances in both branches of our calling, but am firmly impressed with the idea that plastics (blessings though they be to thousands) have forced dental prosthesis to the rear.

Dr. Trueman does not believe that vulcanite rubber is the father of the dental charlatan, and brands my suggestions upon this point as “absurd,” “saddening,” “humiliating,” etc.

He attempts to strengthen his assertions by the statement that

¹ Read before the Odontological Society of Pennsylvania, January 12, 1895.

"writers of a century and a half ago speak as glibly of dental quacks" as do writers of the present day. How could it be possible for a profession to be invaded by pretenders or quacks when such a profession did not at that time exist. I quote from one of the very best authorities when I tell you that dentistry has only taken rank as a distinct profession within the last century. "From advertisements in the newspapers of 1803, the practice of making and cleaning teeth appears to have been in the hands of jewellers and silversmiths." With the "business" in so primitive a condition at the beginning of the present century, we can only refer to all those giving attention to it at that time as pretenders. The doctor would have all "who rose as exponents of dental thought" uncover the pages of history to find "the evidence through which scientific conclusions should be sought." My paper made no pretensions to science; it was intended to be a simple, plain, every-day, common-sense composition, written for the purpose of expressing the thoughts of the writer, without the slightest desire or intention to elaborate or deceive, by the introduction of spread-eagle paragraphs, frequently as deep and as bottomless as the ocean, as dry as the desert, lines calculated to bring slumber to the most chronic case of insomnia. My friend speaks of the long and tedious days spent upon the finishing of a gold or silver denture, of the skill required and time expended in refining and preparing the metals; of the bending of plates into shape, and quite likely their horrible mutilation by that fiendish tool the horn mallet. We are living in an age of advancement. To-day gold plate is as readily obtained as vulcanite rubber, horn mallets will soon be a thing of the past, and when a metal plate is brought into shape by the modern method, there is no necessity of the weary days of "rubbing, rubbing, rubbing."

With all these changes, so much greater the shame that gold plates are not more frequently recommended. What Dr. Trueman condemns in one paragraph he admits in the next; his admissions amounting to little less than a complete acceptance of my ideas, which, as he says, were written without thought, while from his pen flowed the more thoughtful thoughts of a "better informed and thoughtful man."

In conclusion, Mr. President, I must thank Dr. Trueman for his one word of praise.

My paper, while possessing no good qualities, emanating from the "expressions learned parrot-like," which are among the "stock fads" constantly used in our dental meetings, and very much like

the "stuff" in all recent reports of society meetings; this paper, with ideas so "absurd" and amusing, both "saddening" and "humiliating" to him, receives the compliment of being fully up to the times, and on an equal with the general literature of to day. Whither are we drifting?

Such expressions as the foregoing quotations, while probably interesting and entertaining to the writer, can hardly be considered within the code of ethics, and show upon their face a lack of good judgment. After all, which should be condemned, the writing or the publication of this class of criticism?

A NEW METHOD OF ATTACHING ARTIFICIAL CROWNS TO BADLY DECAYED ROOTS.¹

BY GEORGE H. CHANCE, D.D.S., PORTLAND, OREGON.

IN these days of progressive dental surgery, when so much is being accomplished along conservative lines, and when, in addition to other work, very many badly decayed and, to the superficial observer, apparently useless roots of teeth are being restored to health and usefulness, it does not seem strange that the patrons of the dental chair should, as the years roll on, become more and more exacting in their demands upon the skill of the dental surgeon; neither is it strange that when one is listening to such appeals as "Do save that root and put a crown on it!" he should, in response to such an appeal, attempt feats which, to the less skilful and less conservative practitioner, would probably be relegated to the domain of the impossible. This is very apt to be true in cases where the natural crown is entirely gone, and the root so badly broken down and decayed as to be completely covered up by the overgrowing gum tissue. Nevertheless, a varied experience in this special line of practice has led me to believe that, when it is desirable, almost any badly decayed root may be saved and crowned, provided there still remains enough sound dentine to securely hold one end of a small screw-post in place,—presuming, of course, that the peridental surroundings are, or can be, restored to health; but, like all other somewhat complicated operations in the mouth, "hap-hazard" work will not do in such cases. The ground to be

¹ Read before the Stomatological Club of San Francisco, Cal.

traversed must be carefully and intelligently studied, and each step towards the wished-for goal must be taken with due regard to the final outcome.

With these few thoughts by way of introduction, permit me to hold your attention for a few moments while I describe a method whereby such badly decayed roots as have been spoken of may be saved and successfully crowned.

To do this in the most effectual way, I deem it best to take a typical case from my own practice and proceed to describe the operation in full.

The case referred to was that of a gentleman of middle age, and the root to be treated and crowned was a right anterior bicuspid of the upper jaw. The case, when first seen, presented the following conditions: crown entirely gone, decay extending above and beyond the ordinary gingival margin when in a normal condition, gum badly inflamed and entirely covering up the root. The first step in the operation was the removal of the excess of gum-tissue, and, ascertaining that the root still possessed sufficient strength to support a crown, the decay was removed, and the concave depression in the end of the root made smooth with round-ended engine burs, the pulp-canals in the root opened and treated in the usual manner, and the space between the entrance to the canals and the gum margins closed with cotton and Sandarach varnish. The patient was then dismissed for the time being.

At the next sitting the pulp canals were filled, and an impression of the parts was taken in modelling compound, from which a plaster cast was made, and from it dies of Melotte's metal, for the purpose of striking up a thin gold cap to fit the concavity in the end of the root, using enough gold to allow the edges of the cap to extend to the gum margin. When the cap was ready it was adjusted to the root, and, with cap in position, a second impression with "the bite" was obtained, the cap coming away with the impression, which was transferred to the plaster cast. A Bonwill crown of the proper form and shade was then selected, ground, and the upper margins bevelled so that they would just enter and be enclosed by the edges of the gold cap, giving it somewhat the appearance of a banded Richmond crown. The next step was to insert a small screw-post of the proper length in each pulp-canal, which being done, a slot was cut in the top of the cap, large enough to allow the ends of the posts to pass through. The parts were then dried, and the convex surface of the cap painted with a little thick chloro-percha and slipped over the posts to its position on

the root, gentle pressure being used to force out the excess of chloro percha, while a warm blast was thrown on to evaporate the chloroform. The crown was then cemented to its place with oxy-phosphate, and the occluding end in the cavity of the crown capped with gold, the whole forming a firm and, to both operator and patient, a very satisfactory piece of work, which, after several months' use, is still doing good service.

This leads me to say that, in my opinion, the Bonwill crown is not appreciated at its true value, being satisfied that in a large number of special cases much better results can be obtained by the use of a Bonwill crown, or one constructed on the Bonwill principle, in connection with a screw-post and swaged cap to cover the end of the root, than in any other crown in which the pin is directly attached to the porcelain, as in the Logan or other similar crown; and in the event of future accident, causing fracture of the porcelain, the Bonwill crown can be easily replaced without disturbance to the root, or having to do the first work over again, as is frequently the case with pin-crowns.

FIG. 1.



FIG. 2.



I herewith submit two very short roots roughly crowned in the manner described, which will further illustrate the principle and the method of application, as well as suggest to the "bridge-worker" how such roots may be utilized in sustaining small pieces of bridge-work (Figs. 1 and 2).

A PLEA FOR MODERATION.¹

BY DR. B. HOLLY SMITH, BALTIMORE, MD.

It is becoming a matter for serious consideration and thought how far the work of preliminary training shall extend, and what portion of a man's life shall be given to preparation pure and simple.

Among educators this question has been most thoughtfully and ably discussed, and there are not lacking adherents of the practical side of it who would limit the time spent in getting ready for the

¹ Read before the Odontological Society of Pennsylvania, March 9, 1895.

work of life. Theoretically, preparation should be perfect, and, theoretically, no time is misspent which is devoted to thorough, elaborate, and consistent training.

We have been educated up to the point of expecting higher things, and the cry all along the line has been "elevate the standard and raise the dignity of the profession." This has been true, nay, is true, not only in professional branches of education, but in all departments of preliminary work.

Secondary schools all over the country are presenting curricula whose faithful performance calls for the extended and elaborate work of a university. Colleges think it beneath their dignity to confine their efforts to the former contracted limits, and within the trackless maze of the university proper all is lost sight of to the ordinary mortal beneath the cabalistic and mysterious terms of individual "investigation and original work."

The laboratory, the library, the lecture-room, the pen, the printing-press feed and fan the flame, and promote the activity of these swarming original workers. Many are the manuscripts; monographs are multiplied; bloated volumes, immature digests, and accumulations of valueless trifles, the results of frantic strife for doctors' degrees, load the overcrowded shelves of groaning libraries, until we remember with some satisfaction that "of making many books there is no end, and much study is a weariness to the flesh," and would be glad "to hear the conclusion of the whole matter." The fact is, the world has begun to differentiate, nay, has progressed so far along in the way of differentiation that it is extremely difficult to say where the thing will cease. Specializing is the fascinating pursuit which claims the best efforts and attention of our ardent young workers, and getting ready to specialize is the subject that engrosses the stern, restrictive, disciplinary watchfulness of our vigilant leaders and thinkers. What is necessary? What degree of training? What amount of time? How much study? If the limit for these requirements is too greatly contracted, an injury is done the profession and the public. Our conservators, our jealous guardians of professional interests are ever on the alert to guard against this, and elevation of the standard of professional dental education has been the constant aim and care of every devoted lover of dentistry. Thanks to the noble and united efforts of devoted men this end has been most successfully attained. All honor to their efforts. All praise for their success. But are we prepared to go to extremes in this matter? Is there not a golden mean, whose practical and certain attainment is of more real value

than a theoretical elevation of standard which will discourage and prohibit or else beget dangerous practices of evasion and circumvention? To most questions there is what may be called the utilitarian side, and it is certainly true of this particular one.

What is practicable, what is attainable, is better than the ideal and visionary. The former can inspire hope and promise of success, the latter fills us with the gloom of discouragement or renders us guilty of the duplicity of self-deceit.

The course of preparatory dental study has been lengthened to three years, and preliminary examinations are required in accordance with the recommendations and suggestions of the Association of Faculties. This great improvement is meeting with unquestioned approval everywhere, and the benefits conferred upon the profession are not to be doubted for one moment.

Why not go further? say some of our enthusiasts. Why not extend the course to four years, and increase the requirements of the preliminary examination? Can we have too much of a good thing?

Undoubtedly the matter under discussion is simply a question of degree, and it becomes our duty as fair-minded, temperate, impartial men to decide whether we are prepared to side with the extremists on this question.

Is it not the more reasonable plan? Is it not the better and more advisable policy to adjust ourselves to the acknowledged excellent conditions now existing before we create those of a more difficult and exacting nature? Let us make haste slowly in this matter. If we do well in practising the task we have set for ourselves in theory, I think we may well rejoice in the attainment of a great and visible good,—something not to be exchanged for the imperfect realization of more vigorous requirements.

We all know that as far as successful and creditable performance of the real work of our profession goes, we have made ample provision for preparation both in point of time and of requirements.

The practical and successful members of our profession would probably gaze askance at a summons to produce a good knowledge of the classics as an evidence of the capacity to treat diseased teeth. How would the majority of us feel if called upon before giving a clinic to construe ten lines from Virgil, or to scan an ode of Horace. And yet these tests are proposed. A knowledge of the classics is a most desirable thing, so of mathematics,—refining, elevating, cultivating,—but had we not better leave such matters to schools whose special function it is to teach them; and are we prepared to

say to a candidate for admission into the profession of dentistry, "You don't know Latin; then you are not fit to study dentistry."

It seems to me we must limit preliminary requirements both as to subjects and amount; plainly to such subjects alone as are needed for the practical work in lecture-room and office. We have nothing to do with those ornaments and embellishments which are the flowers of culture. We do not dispute that the moral effect would be greater if every dentist were also a savant, —but would the real pain-alleviating power of the profession be increased?

As dentists, I take it, the degree of a man's ornamental culture does not concern us, but the quality and quantity of his necessary scientific and professional knowledge, and that only so far as it is a protection and a guarantee to the profession against ignorance and quackery.

We may resolve that it is a most creditable thing to know Latin, but can we legislate that one cannot be a dentist unless he does know Latin?

Now as to lengthening the time of study in dental colleges. I simply think we are not at present prepared to do it.

Reasons.—1. The dental profession through its institutions of education is already fully abreast of the other professions in its requirements.

2. There is no necessity of overlooking the educational influence of the dental society and the dental journal, nor of expecting that every student who emerges from a dental school should have a finished education; he is only to be equipped with the knowledge which will enable him to grapple with the problem of his professional life; and there will still be much that can be acquired in no other way than by contact with his brethren of the dental profession and in the actual handling of a practice. If we carefully fit good men to profit by these larger opportunities, have we not fulfilled our mission as teachers?

3. We have no right to refuse to recognize the opportunity to establish post-graduate schools, whose influence would benefit in broadening and deepening the culture of the few who could afford these privileges. All schools and all students should not be required to go so far; it would work an injustice and cause the arrest of many a career.

4. We cannot afford to limit the number of those entering our profession to such as are sufficiently well off in this world's goods

to give so extended a time to preliminary training; they are too few.

5. Experience teaches that a man too long kept in leading-strings—that is, under the guidance and direction of teachers beyond the period of greatest enthusiasm and activity—is forever handicapped.

The difference in the two methods may be readily seen by a comparison between the practical efficiency of our own dentists and those of Germany, where preliminary training is carried to its ultimate conclusion.

But beyond and above all am I unalterably opposed to any measures designed to prohibit young and reputable men from entering upon the study of this profession simply as a protection to ourselves.

Such a course would be a crying injustice to them and of suicidal folly to us. The theorists who advocate it have not considered.

Do we deem our profession worthy, let us invite talent to its ranks and stimulate the deserving to join us. No selfish policy can protect us,—and from such protection we should all pray for deliverance.

What do we fear? What do we hope? Our brief span must soon run out, and to whose care must we confide the glorious enterprise of our lives except to the noble youth who glows with the enthusiasm of a generous and honorable emulation.

THE CENSUS OF 1890 AND THE DENTISTS.¹

BY DR. WILLIAM SHAW TWILLEY, BALTIMORE, MD.

IN August, 1890, I was approached by Doctor Richard Grady who, in a joking way, asked if I considered myself "a manufacturer," to which I replied, "No." He then gave me the first information I had received of the intention of the Census Bureau to classify dentists as manufacturers, telling me that one of the enumerators had requested and then demanded of him to reply to the questions of the manufacturer's blank. I assured him I would object to answering, and would only do so when forced, and then under protest. That week, it being the last week in August,

¹ Read before the Odontological Society of Pennsylvania, March 9, 1895.

1890, an enumerator called at my office, and when he pressed the matter I filled in the blank of name, age, occupation, and address, refusing to answer any further questions, which determination was met with a threat of prosecution in the Federal courts. I related my experience to Dr. Grady, who assured me if the profession of the city would support him he would persist in his refusal.

On the afternoon and night of September 30, 1890, I made every effort within my power to gain that support, but failed to succeed. I being the second on the list, Dr. Grady (who had in the mean time made use of the public press to call the attention of the profession to the need of early and earnest action) very kindly assured me of his support should the organizations stand by me, which in a way was done, and I am glad to say he more than fulfilled his promise, as it was by his advice and the use of the public press that the early work was put in shape and condition. Soon the Maryland organizations, with Professor R. B. Winder now as commander-in-chief, were quite actively engaged in the matter. The first official call ever issued by any organization was by the Association of Dental Surgeons of Baltimore City, September 11, 1890, calling a meeting for Friday evening, September 12, 1890.

It was there decided that, inasmuch as the Association was small in numbers, and each member thereof also a member of the Maryland State Dental Association, they would as a body resist the demands, but let the financial support come from the Maryland State Dental Association, which organization issued two calls in the month of November, 1890. At one of these meetings a resolution was adopted "that all members refuse to sign the report offered by the census enumerators, and that the sum of two hundred dollars be appropriated to defray the expenses of the dentist of whom a test case be made."

On January 14, 1891, the public press announced that a committee from one of the city organizations had visited Washington, and, after consultation with special agent Williams, had signed a paper advising the dentists of Baltimore no longer to hesitate in giving the information required. Upon their return and after legal consultation, finding that no penalty was attached for non-compliance, the public press on February 4, 1891, informed us that the same committee "repudiate their action of January 14, 1891, and withdrew their signature to the agreement." I hope soon to give the stenographer's report of this meeting.

After a seeming rest of a year, what was known as the "Willcox Bill," and styled by the press as "a bill in the nature of thumb-

screws and spiked boots," passed the House of Representatives. Again the war-cry was sounded, and the Maryland State Dental Association reaffirmed its action of November 20, 1890, and appointed as a committee Drs. R. B. Winder, Sr., Edward Nelson, T. S. Waters, A. J. Volck, William A. Mills, David Genese, and W. S. Twilley, instructing them to use every honorable means possible to prevent the passage of this bill without an amendment so as to omit dentistry in all its branches from the tabulations of the census. The first official act of this committee, Professor R. B. Winder, chairman, was to urge other State dental organizations to co-operate with them for the end desired. As a result, committees from societies of New York, New Jersey, Pennsylvania, Connecticut, North Carolina, District of Columbia, and Maryland formed the "Associated Committee of the Dental Societies," Dr. John B. Rich, chairman. Many copies of the Willecox Bill were printed, and with the desired amendment attached were sent where it was thought good could be done.

I have since been told by the chief of one of the departments of the interior that they were for a time overrun with protesting letters and marked copies of this bill. From the calm following this work it was thought peace had come, but no; imagine the surprise of your humble servant one evening when, glancing over an afternoon paper, he read that the "Willecox Bill was on file in the Senate for its final reading." Hastening with the news to the ever-willing Professor Winder, he at once, with all that energy which characterized him, worked with untiring efforts for the suppression of this our common foe. The Associated Committee again commenced work, and urged each society and member thereof to bring to bear upon the individual members of the Senate all available influence. To Dr. Rich belongs, so far as I know, the credit of securing a hearing for the dentists, a task by no means to be despised or belittled. At the hearing Dr. Rich, as our spokesman, made such an oratorical and scientific effort, lauding the dentists so highly, that those manufacturers present, with the chairman, Hon. Eugene Hale, of Maine, as their leader, became somewhat aroused, and for a time it seemed as if ours was a lost cause.

Professor Winder, who had worked for two days and nights in Washington with but little sleep, appeared exhausted and unable to raise his voice in a single effort to stem the tide which was now about to carry our little craft upon the rock of destruction. "Opportunity brought forth the man," in the person of Dr. J. D. Thomas, of Philadelphia, who with great diplomacy changed the

dark clouds of despair into bright rays of hope. There was yet a chance for the sinking ship, and with hope still within our hearts we sought to regain our position and succeed.

I arose, asked for five minutes of the committee's time. With a manufacturer's blank in my hand I read the questions asked and repeated the answers given. The whole thing seemed so ludicrous that Mr. Hale exclaimed, "I do not wonder you gentlemen object, if those were the questions asked."

Mr. Porter (who had travelled for two days and nights to be present at this meeting, as he afterwards remarked) replied that with the great number of men he had to employ it was impossible to avoid getting an ignorant one occasionally, and had he known of this enumerator he would at once have been discharged. To which I answered, "You could not help but know, as we were given the ordinary manufacturer's blank in printed form and you had before you our letters of objection, and yet this enumerator was kept upon the force for over eighteen months, and may be there now for all I know."

We were asked what we wanted. It was so easy to tell the "old old story,"—"To be classified with the lawyers and physicians."

Mr. Porter, realizing for the time being that he was defeated, answered, cheerfully, "Why, certainly, gentlemen, I will attend to it." Dr. Rich displayed his acuteness by demanding a "written statement to that effect right here while we are all present." Mr. Porter, who had started to leave the room, returned to his seat and wrote the original, of which this is a copy:

"The Superintendent of the Census agrees with representatives of the Dental Associations, at a meeting of the Senate Committee on the Census, to carry out the spirit and purpose of the amendment presented by the said Associations at the meeting, and which appears in the paper marked "A" hereto attached.

(Signed)

"ROBERT P. PORTER.

"JUNE 27, 1892."

Success was now assured, victory was stamped upon our banners. Then followed hand-shaking, congratulations, and dinner with Dr. Williams Donnelly, where Drs. J. D. Thomas, of Philadelphia; Charles A. Meeker and F. C. Barlow, of New Jersey; H. B. Noble, John B. Rich, and Williams Donnelly, of Washington; R. B. Winder, William A. Mills, and William Shaw Twilley, of Baltimore, enjoyed the "feast of reason and the flow of soul."

A NATIONAL DENTAL MUSEUM¹

BY DR. H. B. NOBLE, WASHINGTON, D. C.

SOME years since I claimed exemption from jury duty as a surgeon, and after a legal battle was sustained in this position, and no dentist has since then been placed in the jury-box.

Many cases in actual practice have sustained this position. A case in point: The jaw of Hon. William H. Seward, the Secretary of State under President Lincoln, was broken in his attempted assassination. A dentist of New York (Dr. Gunning) was called upon to take charge, and did take charge, at the request of the Surgeon-General of the United States, and conducted the case to a complete restoration, and to the satisfaction of every one.

If we are dental surgeons and a specialty of the medical profession, let us take our proper place in the National Medical Museum and Library, unfortunately so little known, and slightly appreciated by the dental profession throughout the country.

Here we have in a fire-proof building a valuable collection of specimens and books, under the efficient management and fostering care of Dr. John S. Billings, and maintained at government expense. It is a part of, and on a par with, the other scientific departments of government.

Here should be found a history of dentistry and a general depository for dental archives of all things pertaining to it which may have a present or a future historical or educational value.

That the profession is imbued with the spirit of homage to those whose labors and achievements have elevated our calling to a place among the liberal professions was made manifest at the late gathering in Philadelphia to honor the name of Horace Wells, the discoverer of "anæsthesia."

Could there be a more appropriate place for the repose of memories, whether of marble, bronze, or painted canvas, or one's own laboriously collected library?

Such a museum or library would be an appropriate place for the proposed statue of Dr. Horace Wells, surrounded by a library such as that of Dr. H. J. McKellops, of St. Louis, and the historical collection of Dr. Taft's committee of the World's Columbian Dental Congress.

¹ Read before the Massachusetts Dental Society at their annual meeting, June 5 and 6, 1895.

Here should be recorded all the great and important inventions and scientific discoveries that have been and are being made, and the names and record of eminent and celebrated men who have labored for the advancement and elevation of our profession. Many of these records are now in the keeping of local societies and individuals, and if not soon cared for will be lost to the general profession.

Such a museum, library, and memorial hall, in connection with the National Medical Museum, would receive the aid and fostering care of the general government, and be under its care and protection.

If we work in harmony with the medical profession, such a hall and library of our own can be secured.

Reports of Society Meetings.

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, April 16, 1895, at the New York Academy of Medicine, No. 17 West Forty-third Street, New York City, with the President, Dr. Northrop, in the chair.

The questions for the evening's consideration were,—

1. "Which method of root-canal filling furnishes the most complete obliteration of this space?"
2. "What is the surest treatment to secure root-canal sterilization?"

DISCUSSION.

Question 1 was first considered by a paper of Dr. S. G. Perry.
(For Dr. Perry's paper, see page 527.)

Dr. Darby briefly replied that he considered oxychloride of zinc the best for this purpose, and had thought so for twenty years. He might be mistaken; if so, he did not know it.

Dr. Louis Jack.—The results of clinical observations appear to establish the conclusion that upon the complete obliteration of root-canals of devitalized teeth depends the prevention of after-disturbances of the periodontal membranes at the apical region.

If open space remains, it will inevitably become at length occu-

pied by organic matter, which enters by imbibition through the foramen, or by the channels of the canaliculi of the fang, which at length must acquire an infectious quality, and will sooner or later have the specific character which has been elucidated by Dr. Miller.

This consideration must also apply to all methods of root-filling, when attempts are made to occlude the apex with porous substances charged with antiseptics, as when the antiseptics terminates by the diffusion of the chemical the porous filling-material is little better than an open space. In my experience the most dangerous conditions have accompanied cotton filling in roots.

To the filling of canals where they are of good size and can be easily made accessible, such as the six front teeth, the palatal roots of upper molars, and distal roots of lower molars, I have found no substance so good for filling the apical portion of the canals as small cones of gold-foil malleted into place, the remainder of the root being filled with gutta-percha or oxychloride of zinc. For the small canals of bicusps, the buccal canals of upper molars, and the mesial roots of lower molars, the oxychloride of zinc or chloro-percha pumped in as far as attainable have been my usual reliance.

Dr. E. C. Kirk.—Fill the desiccated canal with melted paraffine and pack in a gutta-percha cone of proper size and shape, avoiding excess of paraffine.

Dr. A. W. Harlan.—There are three substances which may be used to obliterate canal space,—wax, gutta-percha, and paraffine. All are unalterable in the root of a tooth, all comparatively easy to introduce. Not one of these materials will absorb moisture or deteriorate in its presence in such a place as a root. The roots must be dried and a solvent used to liquefy gutta-percha, wax, or paraffine. After a portion of the liquefied substance is introduced, a larger, more solid piece, attenuated or pointed, may be packed directly into the roots until they are completely filled. Force, combined with gentle heat, will be sufficient to pack the roots full of either material. I prefer gutta-percha. Teeth will not be stained by deterioration of the filling-material, and no permanent soreness will ensue in case a small quantity is forced through the apex. It will exfoliate or become encysted.

Dr. C. N. Peirce.—I have but a few moments to reply to your inquiries. Without doubt in my mind, gutta-percha, when properly applied or inserted, makes the most complete root-filling; but it is only mechanically so; as you know, it has no therapeutic influence. With zinc chloride or some other good antiseptic in advance of it,

it probably cannot be excelled. Salol I have used with great satisfaction, but experience with it is of too recent a date to say what of the future.

Dr. S. H. Guilford.—The fact that so many substances have been used by different practitioners, with apparently equal success, makes it difficult to designate any particular one as best. Years ago gold-foil, employed by those who were really skilful in its manipulation, produced most satisfactory results. Gutta-percha and oxychloride of zinc followed, and appeared to answer their purpose perfectly, while later carefully-prepared sheep's wool furnished a record of usefulness unsurpassed by any of those that preceded it.

Large experience and length of time have, I think, about decided that for ease of introduction, perfect filling of the space, non-shrinkage, and unchangeableness, together with its aseptic qualities, oxychloride of zinc heads the list of materials suitable for root-canal filling.

Dr. L. D. Shepard.—I judge you want the methods which each uses, and not theorizing. For very many years I have used the red gutta-percha, which I roll into a fine and long cone. This may be two inches long, and tapering from one-sixteenth to one thirty-second of an inch at its greatest diameter to a point. Working some chloroform into the canal, I take the cone in a pair of delicate forceps, hold it a moment or so in chloroform, so that the outside is softened or partially dissolved, and then press the cone, *cold*, into the canal. This cone, while soft and sticky on the outside, is, as a whole, stiff, elastic, and yielding, and, I am quite sure, "obliterates the space."

Dr. John S. Marshall.—In my judgment, chloro-percha and gutta-percha points most perfectly obliterate this space.

Dr. McQuillan.—I consider, where care is used not to force the material through the apical foramen, that the oxychloride of zinc is the very best for filling the canal.

Dr. J. B. Littig.—The best method of root-canal filling is the one wherein we place in the root-canal a few fibres of cotton, twisted on a smooth broach and saturated with oxychloride of zinc.

Dr. J. Y. Crawford.—I believe the very best results in filling root-canals can be accomplished by thoroughly drying, and, when exudates have ceased from the apical region, trim a small, fine needle of orange or some other wood made sterile by proper treatment, and around the tiny end of which roll a small quantity of Abbey's soft gold-foil, and then top it into the apical third of the

canal, after which the remaining portion of the canal can be filled with any of the reputable root-fillings desired, except tin, lead, and amalgam. The objections to the tin, lead, and amalgam are that they are factors in the discoloration of pulpless teeth when placed in the roots. I believe by this means that space in the canals can be most effectually obliterated.

Dr. G. V. Black.—Gutta-percha cones, not started into the canal with pliers and a hit-or-miss effect made to force them home, but stuck onto the end of a properly-shaped root-canal plugger, the size having been ascertained by trial, and sent to place with certainty. The canal is to be well moistened with oil of eucalyptus first. Canals too small for this are done the best I can with gutta-percha dissolved in chloroform, but this only when I cannot do better.

Dr. J. N. Crouse.—I would recommend the following method: Put some oxychloride of zinc at the entrance of the root-canal; then wrap one or two thicknesses of No. 10 gold around the end of a broach, dip it in oxychloride of zinc, and push it carefully into the end of the canal, using it as a medium to carry the oxychloride. The gold should be lapped loosely around the end of the broach, so that when it is carried into the root-canal the broach can be removed, leaving the gold and oxychloride of zinc at the end of the canal. Gold can be carried in this way to the end of the smallest canals; and by taking a watch-maker's pivot broach and drawing the temper just enough to get the blue color, you have a spring temper which I think makes the best instrument for filling in this manner. If the gold is carefully wrapped around the broach, and the oxychloride is carried ahead of it, the canal is thoroughly filled and all the air is excluded. This practice has given me the best results, and I cannot remember when I have had trouble with a root which was filled in this way.

Dr. R. R. Andrews.—I do not know which method furnishes the most complete obliteration of space in root canal filling. My simple method works well: after cavities are prepared, I use chloroform, then liquid gutta-percha, then gutta-percha points, then heat with hot air, and pack solidly.

Dr. Foster.—I am of the opinion that the complete obliteration of the space in the canal and tubuli is never fully accomplished. I am under the impression, from clinical experience, that the filling-materials best adapted for this purpose are chloro-percha or chloride of zinc and salol. The method of filling is nearly the same with such materials,—a complete isolation of the canal from the

fluids of the mouth, thorough dryness of the canal, and, when salol is used, the tooth to be heated externally by the use of an instrument made this shape [see illustration], and heated over an alcohol lamp; when hot, place on the tooth and hold in position until the patient complains of the heat as almost unbearable; then fill with salol by pumping it into the canal with a broach. Capillary attraction will aid its introduction.



Dr. J. Taft.—In reply to this question, it may be said that every canal should be thoroughly cleansed and formed with the least practicable loss of material to best facilitate the introduction of whatever material is used.

There are several methods of filling these canals by which all the space can be filled. It is well, after the preparation of the canal, that it should be closed at the end of the root as nearly as practicable; then form a cone-shaped piece of lead, or even a fine-grained piece of wood saturated in some antiseptic fluid; carbolic acid or creosote would serve the purpose. These should be made as nearly as possible of the same shape as the canal, so that upon being pressed in it would fill it, without, however, great pressure. When this cone-shaped lead or wood is prepared, it may be coated upon the surface with oxyphosphate of zinc, and then pressed firmly or driven lightly into the cavity, cutting off any portion that may protrude from the canal or pulp-chamber. By this method not only would the space be completely occupied, but the open ends of the tubuli would be filled. Of course, other materials than lead or wood may be used, as gold, silver, copper, or tin. None of these are better than lead or wood. By this method the canal will be absolutely filled.

Dr. Truman.—I am asked to reply to two questions. First, Which method of root-canal filling furnishes the most complete obliteration of the space?

This hackneyed subject has become so exceedingly wearisome that I might be pardoned for tersely stating that no method will obliterate all canals, and it is believed this would be strictly true. It will in the main be true of the central canals, and is always true of those minute canals permeating the dentine rarely or never taken into consideration. The question, however, does not embrace this more extended view, and hence we are left to the question as stated.

There are a great number of filling-materials that will fill the space, if that be all that is required. In ordinary canals gold answers an excellent purpose, and it cannot be gainsaid that some who practised the method in the first period of root-filling, of whom the writer was one, were quite as successful in results as at the present time. But, then, gold or any metal cannot be forced into the minute canals for any depth, as in the superior buccal canals of molar teeth or the anterior roots of the inferior. We are then left to other materials, and, for the same reason as applied to the metals, must discard cotton. The plastics are alone left, and the recently-advocated agent, salol, melting at a low heat. Of the plastic materials, gutta-percha, if made into a semi-solvent solution, would probably fill all non-microscopic canals. There would always be a doubt about it, as there is no possibility of proving the fact. The value of gutta-percha as a filling-material is here left out of the question as not germane to the subject.

The next in importance, if not transcending the previous materials, is oxychloride of zinc. It is by no means certain that this when made in a thin semifluid can be forced into minute canals, but it would probably do this better than gutta-percha.

If all that has been attributed to salol be true,—that when melted it will run by capillary attraction into the minutest canals and then speedily harden,—we have at our command the best material. The question is, Do we know this to be true? Extended experiments out of the mouth in freshly-extracted teeth placed in exactly the same position as in the mouth will alone settle the question. All the processes known as wood filling, gold-wire filling, etc., may be left out of the question, as they cannot, strictly speaking, fill anything; also agents used on cotton or asbestos fibre, such as the balsams, as they cannot reach minute canals.

It thus seems to me, in considering this question, that, for the mere purpose of filling minute canals, salol promises better than any other material. If this were all that is required in canal filling we might rest content; but it unfortunately is not all. Indeed, in the opinion of the writer, it is the least important of the points to be considered.

It almost reaches the point of absurdity to query as to what is best to fill the central canal when the organic matter in innumerable canals is left to the tender mercies of the germs of putrefaction and eventual discoloration of the teeth. As salol is not expected to do more than fill the main canal, and in a degree render it aseptic, that agent which will do more than this—not only fill

the canal possibly to its minutest ramifications, macroscopically considered, and then by its coagulating properties reach the organic contents of the tubulated structure—must be the best; and I therefore hold that there is nothing superior to chloride of zinc, for it will, as far as known, quite effectually fill the canals and coagulate all dead material in the dentinal tubes.

Dr. Ives.—For the last ten months I have discarded everything in root filling for the following: First, accurate measurement of the root-canal; second, the use of a copper wire; third, the preparation of pure beeswax in a water-bath, to which is added any antiseptic you use,—iodoform, if you wish. I take a thread of the beeswax, and with a spatula roll it down to an absolute point. This, fastened onto the end of a nerve-instrument I pass up as far as possible. With an Evans root-dryer, heated, I drive the wax into the tubuli, adding wax till the canal is full, then with my heated copper point, which protrudes slightly into the pulp-chamber, I send it right to the end. I know that every part of that root-canal is absolutely filled. What space there is between the side and the copper point is filled with the beeswax. Beeswax does not expand nor shrink, and it is not affected by acids or alkalis. I have had great success with it, and have discarded everything else for it.

ANSWERS TO QUESTION 2.

“What is the surest treatment to secure root-canal sterilization?”

Dr. Jarvie.—The two questions that are presented for our consideration this evening are of such importance that if they are answered rightly, and the answers of such a character that the *modus operandi* can be put into practical operation and carried into effect by the average dentist, much time and suffering will be saved by the public, and much trouble, annoyance, and discomfiture by the dentist; for no class of teeth with which we have to deal causes so much pain to the patient and so much dread and uncertainty and perplexity to the operator as that which requires “sterilization of the pulp-canal” and “complete obliteration of the root-canal by filling.”

The question, “What is the surest treatment to secure root-canal sterilization?” is the one given to me upon which to speak; but the time for preparation has been so short that I shall not attempt an exhaustive treatise upon the subject, but content myself by placing before you, in as simple and as brief a manner as possible, the process I employ and the agents I deem best fitted to bring about the desired result.

The word "sterilization" which occurs in the question would imply that germs are already in existence, and the pulps in a state of putrescence, in the class of root-canals the treatment of which we are to discuss this evening, thus eliminating from the discussion that class of root-canals from which recently devitalized pulps have just been extirpated.

In treating the class of teeth in question, such a course must be pursued that not only the root-canals shall be completely sterilized, but that the contents of the tubuli shall be sterilized also, otherwise the contents of the tubuli may become decomposed and form gases which, having no outlet into the pulp-canal, may force their way out through the cementum, and thus become a constant source of irritation to the pericementum and a subsequent cause of the loss of the teeth. It is seriously questioned by able pathologists whether there is organic matter enough in the tubuli to bring about any such result, but as long as there is the slightest doubt in the matter we should so treat canals and tubuli as to reduce danger from this source to a minimum.

The conditions existing in the root-canals of teeth requiring antiseptic treatment are so different from the conditions existing in almost every other part of the body that treatment which would be proper and successful everywhere else fails utterly in root-canals. In wounds, burns, abscesses, tumors, and in almost all septic conditions the parts are more or less readily accessible; large quantities of the antiseptic may be used as compared to the septic surface, and thus an agent that would be altogether too weak to penetrate and asepticize putrescent matter found in root-canals would be successful. An antiseptic with penetrating qualities powerful enough to permeate putrescent pulp-matter to the uttermost end of a small root-canal has such injurious effect upon tooth-structure as to render it useless for our purpose; therefore thoroughness of mechanical or surgical removal of all putrescent matter in the canals must be depended upon for success rather than for therapeutic effects.

To remove all putrescent matter, use paper points, barbed broaches, shreds of cotton, etc., and as much as is possible enlarge the small canals with square or five-sided Swiss watch broaches. Neither the number of sittings nor the lapse of time is to decide as to the termination of the treatment. Entire removal of septic matter, thoroughness, completeness of this part of the work is the absolute *sine quâ non*, and this can be accomplished at one sitting as well as at a dozen.

With heat, dry the root of the tooth as much as possible. The method I have employed recently, the idea of which I got from Dr. Van Woert, is to roll a piece of copper wire so that the small end is fine enough to penetrate and flexible enough to follow most canals. Insert the wire into the canal with the other end protruding from three-quarters of an inch in the case of a front tooth to possibly two inches in the case of a back tooth. Heat the bulb of an Evans root-dryer, having first removed the point, until it is quite hot, and then insert the protruding end of the wire into the hole in the bulb. Copper being a good conductor, the heat from the bulb will be conducted to the extreme end of the wire, and you will thus get a condition of dehydration in the root-canal and tubuli such as cannot be obtained in any other manner that I am aware of. This method of heating the root-canal is much superior to the ordinary one of a blast of hot air from a syringe, a method by which the crown of the tooth is in danger of being broken by excessive dehydration, while the hot air penetrates but a very short distance into the root-canal, where the dehydration is desired.

The root-canals being now freed from septic matter and the tubuli and canals as dry as possible, they are in the best condition to receive and absorb the antiseptic selected to be applied.

Accepted authorities differ as to the best agent for this purpose, but I think nearly all will agree upon one of the following four as the very best,—*viz.*, carbolic acid, chloride of zinc, oil of cinnamon, and oil of myrtol. The experiments of Professor Miller, of Berlin, give the penetrating properties of the first three in the order I have placed them. I do not know that he has experimented with the oil of myrtol, but he places carbolic acid and the chloride of zinc ahead (in this property) of any of the essential oils. Professor Harlan places a high value upon the oil of myrtol, and prefers it to any other antiseptic as a root-canal dressing, claiming that the essential oils are much superior to any coagulating agent; in fact, denying the use of any coagulant, claiming that the coagulum formed at the end of the tubuli next the canal prevents the entrance of the antiseptic, and so permitting the contents of the tubuli to continue septic, with all the consequent evils.

On the other hand, Professor Kirk has apparently demonstrated that the coagulum found at the mouth of the tubuli becomes a medium by osmosis, for the penetration of the tubuli by the antiseptic.

In this condition of things, where two men, so eminent, each

apparently proves the other wrong, each one of us must rely somewhat upon the clinical result of the observation in his own practice. I have been successful with carbolic acid; but if the preparation of the canal has been thorough up to this point, I have no doubt but that you will be quite as successful with the oxychloride of zinc, or the oil of cinnamon, or the oil of myrtol.

Now, gentlemen, I know that it is much easier to write how to remove all septic matter from root-canals than it is to do it. I know, too, that in some cases it is an utter impossibility; but I know, also, that the nearer we approach the perfection of the treatment I have attempted to describe, the nearer we will have complete success in results.

Dr. Darby answered the question by stating that he used sulphuric acid and hot air (bicarbonate of soda after the acid).

Dr. Louis Jack.—My answer to this must require the subdivision of cases into those freshly devitalized and those which from any cause have become infected.

In the first class my reliance has been to freely use aristol to saturation with oleum gaultheriæ, and to fill the canals as soon as possible. I should state this is done as soon as all of the pulp-tissue can be removed.

In the second class the question is not so easy, and no one substance can, in my understanding of the subject, be always depended upon. To well consider cases of this kind, they should be arranged in several classes, to meet the various conditions which are presented. The most important consideration is not to force the infectious matter contained in the canal through the foramen, and to avoid the use of infected instruments. I consider it safer to oxidize the contents of the canals with permanganate of potash, by inserting a small crystal, and permit it to decompose the organic matter present, and afterwards to carefully cleanse the canals, following with aristol and oleum gaultheriæ in cases where pus is not present.

Should pyæmic conditions exist, my reliance is upon zinc chloride five to ten grains to one drachm of water, or formalin five-per-cent. solution, in all cases following with aristol as before.

I am careful to avoid the use of irritating medication, and believe better results follow the above line of treatment than when more active remedies are employed, such as pure carbolic acid and corrosive sublimate.

The larger my experience grows the more I am convinced that the greater difficulties of sterilization are neutralized by the lack of

the perfect cleanness required at all stages of the treatment. The force of this principle was impressed early upon me by the rules of Dr. Maynard in the treatment of devitalized teeth. His major consideration was that surgical cleanness was of the highest importance, and after this the perfect obliteration of the root-canals. In the treatment of this class of cases Dr. Maynard was super-eminent. His results were produced by the greatest care in the treatment, and the utmost patience in the subsequent closures.

Dr. E. C. Kirk.—By the application of (1) a saturated solution of sodium peroxide, and (2) twenty-five per cent. pyrozone.

Dr. A. W. Harlan.—Repeated washings of the root-canal, first, with neutral peroxide of hydrogen or pyrozone; second, with cinnamon-water or peppermint-water. Dry the interior and introduce a strand of silk or cotton wet with myrtol; seal this in the cavity for one or two days with gutta-percha. After this is taken out, do not let saliva or water get into the root. Fill it.

Dr. C. N. Peirce.—For sterilization there are a number of antiseptics which work with almost equal efficiency. Electrozone and pyrozone have both done good service; but for thoroughness in removing all decomposing organic matter there is nothing which goes to work with a determination to clean out everything which is impure as does the sodium peroxide. I have no hesitation in putting a minimum portion of this in the root, and, covering it over with gutta-percha, let it revel for twenty-four hours; then I wash it out with dilute sulphuric acid.

Dr. S. H. Guilford.—Root-canal sterilization can, I think, be best secured by first removing with a drill (where possible) a portion of the most infected dentine bordering the canal, and then subjecting the remaining portion of the dentine to the action of some sterilizing medicament that will be rapid in its action, efficient, and non-injurious to tooth-structure.

Mercuric bichloride, while it stands first in the list of germicides in laboratory experiments, has fallen far short in its efficiency in actual practice. Carbolic acid has produced better results at the hands of the majority of practitioners than many other agents with a higher laboratory record; while iodoform, which Professor Miller claims is not a germicide at all, has at the hands of the writer produced better results as a root sterilizer than any drug he has ever used.

Dr. John S. Marshall.—First, thoroughly remove all pulp debris by broaches wrapped with fibres of cotton. Second, disinfect with

ninety-five-per-cent. carbolic acid and dry the canal. Third, flood the canal with absolute alcohol and evaporate with hot air until thorough desiccation is obtained. I succeed best by these means. The rubber dam is indispensable in all cases.

Dr. McQuillan.—In treatment of infected canals I have had the best results from the use of sodium and potassium, followed with twenty-five per cent. pyrozone, three per cent., and thoroughly drying with hot air. I have never had so much satisfaction as in the last two years, when I first began the use of this method, which was suggested by Dr. Shreier, of Vienna.

Dr. Littig.—Thoroughly cleansing and drying. The kind of drug employed makes but little difference as to whether it is a coagulant or not.

Dr. Crawford.—The surest treatment to effect root sterilization is first to isolate the tooth by the use of rubber dam; dry the cavity and as much of the canal as possible before proceeding to cleanse the same of foreign contents; in the first explorations be certain to avoid too much pumping with medicated swabs. Use *bichloride of mercury not stronger than one to three thousand* to frequently wipe out the canal during the operative procedure, so as to keep sterilizing all the newly-infected particles that may occur. When the canal is thoroughly cleansed and made perfectly dry, close it up for a few minutes with a dry tampon of cotton to give the last wiping of bichloride of mercury time to act upon any bacilli or micro-organisms that may be present. If it is desirable to test the condition of asepsis thus produced, I would recommend the thorough packing of the canal with cotton saturated well with pure *German beechwood creosote*, as this is the best antiferment that has ever been placed in the canal of a pulpless tooth. In addition, it certainly has some anodyne effect upon the peridental membrane when it is coincidentally involved as a result of a septic condition of the contents of the pulp-canal.

Dr. Black.—Pack with oil of cassia or some mixture containing it in sufficient proportion, not less than one-sixth. The 1, 2, 3 mixture is my standard. Close the cavity perfectly with gutta-percha,—no cotton or gum,—moistening the walls with eucalyptus first, and let it remain one week. Put on the dam before beginning and before removal at the end of time.

Dr. Crouse.—I generally use this method: when the pulp has been dead some time and the tooth needs sterilizing, I use what I think is called Black's 1, 2, 3 compound, composed of one part carbolic acid, two parts oil of cinnamon, and three parts oil of winter-

green. Oil of cinnamon will sterilize a tooth quickly, but should not be used for the front teeth, as it frequently turns them yellow. For teeth in the front of the mouth I use bichloride of mercury, or carbolic acid, or both; the bichloride first, and then the acid. After applying arsenic I generally remove the pulp in two or three days. This can be readily done by wrapping a little cotton around a small, smooth broach, forcing it into the canal, and twisting the broach slowly, when the pulp will usually cling to the cotton, and thus be removed entire. After this I fill immediately, using the above-named medicine before putting in the oxychloride of zinc filling.

Dr. Truman.—I suspect the best reply to make to this would be, I don't know. The means for effecting sterilization in anything are as yet in their infancy, and any dogmatic statement that this or that method will effect it must be taken with a large allowance for error.

The question is not free from ambiguity. It is difficult to know whether sterilization is meant to include the time just previous to filling, or to prevent the remote and very possible element of danger that may arise subsequent to the filling. It is assumed that it is intended to apply to the first-named condition, and upon this understanding it will be considered very briefly.

As the main canal is alone in question, it is very plain that we are left to the agents that effectually inhibit pathogenic germs. I do not use the word destroy here, for I have no positive proof that germs can be absolutely destroyed upon a vital tissue and it retain its vitality. The antiseptics in use in dentistry are limited, but in my opinion no reliance should be placed upon a single one of these, but the treatment should be by a continuation of agents and methods. The importance of sterilization to the fullest extent possible cannot be overstated.

To intelligently consider this question, the condition of the root should be taken into consideration. All canals are not equally charged with decomposed matter; but, as this is an uncertain quantity, they should be given the full benefit of the existing doubt and treated exactly alike. This involves, first, thorough cleansing of the canal; second, equal thoroughness in making it aseptic.

The agents used may be briefly stated to be,—

1. Those that act on organic matter.—hydrogen dioxide or pyrozone; or the alkalies, as sodium peroxide; or a combination of the escharotics and alkali, as the process recommended by Dr. Cal-

lahan of sulphuric acid and bicarbonate of soda. These are practically cleansers, while in a degree they are antiseptic.

2. Follow with one of the following antiseptics proper: mercuric chloride, hydronaphthol, thymol, creolin. The latter I regard as one of the best antiseptic cleansers we have in use. Used in full strength with cotton to wipe out the canal, it is most effective. If this has been carefully done, the canal should be dried by the warm-air blast. This, in my judgment, is the proper treatment of the canal, and will place it in the best possible condition for subsequent filling, if the minute microscopical cells are not to be considered. If these are regarded of vital importance, as unquestionably they are, then the filling as recommended in answer to question first, oxychloride of zinc, must, in my opinion, be adopted, as I place no reliance in the lasting effect of any of the essential oils.

Dr. Taft.—The treatment of any pulpless canal should and ought to be regulated by the conditions that may be present. A canal from which a healthy or comparatively healthy pulp has been removed, when cleansed, is in the best condition for filling. No sterilizing nor antiseptic treatment is indicated if the tooth has been protected against moisture and the entrance of foreign substance. Medication of such canal is likely to be attended with more injury than benefit.

The question of coagulating treatment to act upon the contents of the tubuli has excited some discussion. The introduction of coagulation into a thoroughly cleansed and prepared canal will not, perhaps, in any case be the occasion of injury. The extent, however, to which it may be operative, will depend upon the character of the agent and upon the condition of the structure to which it is applied. Greater penetration will be effected in some teeth than in others. It is a question not yet decided as to whether such coagulation accomplishes any benefit or not.

Canals in which pulps have been destroyed by disease are presented in very different conditions. In some the remnants of desiccated pulp remain, while in others the entire structure of the pulp is broken down and the canal filled with pus or sanies. With a desiccated exudate through the canal, simply cleanse by manipulation and wash with warm water or some simple dilution; then, after drying the canal, some antiseptic agent may be employed.

Sulphuric acid treatment, brought prominently to the notice of the profession within the last two years by Dr. J. R. Callahan, is in very many cases of pulpless canals an excellent treatment. By its

introduction it facilitates the removal of all *débris*. It also acts upon the walls of the canal, dissolving from the surface more or less according to the strength and amount of the acid used, thus enlarging the canal instead of with an instrument. After the employment of this mode of treatment no further sterilizing agents need be used. Every organism reached by the acid would be effectually destroyed.

In all favorable conditions canals should be filled immediately after their thorough cleansing and proper forming. In the less favorable cases expectant or test treatment in the way of thorough closure with some easily removable substance, such as gutta-percha or Hill's stopping, may be employed, this remaining for a few days to a few weeks according to the more or less favorable conditions that are apparent.

Dr. Andrews.—I do not know the surest method of canal sterilization. My method, though very simple, works well: clean thoroughly, use five-per-cent. pyrozone, dry thoroughly, and then fill, having all instruments surgically clean.

Dr. Foster.—Bichloride of mercury, or cyanide of mercury, or chloride of zinc.

Dr. Hart.—I do not think that Schreier's preparation of sodium and potassium will ever become popular in general practice. We may use it now and then, but it is a preparation that takes longer to apply in any canals than the medicaments that we usually employ. I see that one gentleman recommends leaving it in the canal and sealing it up. I can scarcely understand what advantage would ensue, because it acts so quickly that immediately upon its being placed in any canal where there is moisture the effect is obtained; the bubbling of Schreier's preparation is immediate, and I think there is a distinct disadvantage in leaving it there after the effervescence has taken place. One might summarize what we have heard to-night and come to the conclusion that cleanliness is the principal thing. We have heard praised nearly every therapeutic agent that we use to obtain asepsis in a root-canal, and no doubt each one is successful after the proper cleanliness has been obtained. In my own practice, after using bichloride of mercury, 1 to 3000, for some time, I went back to the old standard, carbolic acid, and have used that ever since. It may have been from the method I used, from pumping too hard in the canal, but I do not think that was it, because I used the same care that I do with the carbolic. I do not dread the coagulating influence of the carbolic acid. Whether it is that the subsequent asepsis is induced by the os-

motie action or not I cannot say, but I have had least trouble with the carbolic acid.

Dr. Merriam.—Dr. Whitton, of Boston, whose early death is, I believe, the greatest loss that Boston has had in my day, gave this subject a great deal of attention. One part of his practice that I have not heard mentioned in connection with the subject to-night was always to remove by a rotary motion. An evil that exists in the schools is the probing by students; the desire of the student to see how far he can get when he first opens the tooth, perhaps to satisfy himself or to excite the admiration of the patient, is natural, but the passing of an instrument through a putrid mass is certainly a most dangerous thing. Dr. Whitton's method was to wind cotton carefully on small broaches, having as many as needed ready for each case. He removed carefully from the pulp-chamber, and as fast as the cotton on one broach became soiled he took a fresh one, and spent all the time necessary at the first operation in cleaning the root. He filled a great many of his cases immediately, and, as nearly always follows, I think with any one who adopts a system and gains the confidence of the patient, he had very excellent results. One thing about the peroxide which we mentioned to-night, I think we overestimated it and its effect on the tissues. We should think of it as a detergent, and to the extent that it is a detergent it is of benefit; but it has no effect on the tissues themselves. At Billings & Clapp's, Boston, who make the best peroxide I have used, they were kind enough to tell me that it was best to buy it from the nearest manufacturer. I have followed that hint since, going right to the factory and getting what I need. We are all very much better off than formerly in the instruments that we have. The music wire that has come to our assistance allows us to make instruments and to use them with better security than anything we had before.

Dr. Hodson.—I am fully persuaded that perfect cleanliness is our sheet-anchor in the premises, and the most perfect elimination of all septic material the very first necessity, the methods are individual. My own plan is never to touch putrescent contents of the canals upon first opening to them, but apply full disinfection under a cotton and wax dressing for twenty-four hours, and even then am specially careful, after very gentle use of the bare broach for the mass, not to push anything (even air, which in the circumstances would be poisoned air) through the ends of the canals, which I am persuaded any swabbing out process will surely do, but I alternately fill the canals with warm water by syringing, and then

draw it loaded with putrid material down and out by capillary attraction through the insertion of the paper points, which I presented to you twenty years ago (and which, by the way, another man has applied a little extra stiffening material to and boldly advertises the whole as his own). This is a *pulling process* entirely, and I cannot but feel it to be, to me at least, of real value in the premises. This principle of capillary attraction I employ in many directions in my general work, and find it of real value.

Dr. Sailer.—One point of our discussion which has not been developed very largely, and at which I have been somewhat surprised, is the nerve instrument. Dr. Guilford alluded to the drill, but I would rather call it the nerve-canal drill. I think Dr. Guilford has struck about as clear a way of sterilizing a root as we can possibly get at. If you cut away the dead matter you certainly sterilize it. You can then use the cleansing medicament, and cleanse out what is left. I always follow the process of using a canal-drill and taking out the dead matter and enlarging the canal as far as I can, then, as we heard to-night, avoid carrying the dead matter through. You can always avoid that by using a hook instrument made by Donaldson, using a large one first, and reducing it gradually until you can just get to the end of some of the roots,—not all, of course. You will not have much trouble if you do that. I want to call attention particularly to the nerve-drills. To my mind, those are the most important instruments in sterilizing the canal. I have very frequently drawn out a putrid nerve by the use of a small nerve-drill. In doing that, you want to use a drill that is very much smaller than the nerve itself. I do not mean this for interior roots of lower molars or some of the inferior teeth, nor for the buccal roots of superior molars.

Dr. Brockway.—The first step in the sterilization of a root-canal is to get as free access to it as possible, cutting away at the *outset* all that you intend to. For the removal of the contents of the canal, I make much use of the Morey or Gates-Gliddon root-drill, while using them having my assistant at the same time pump into the canal from a syringe water as hot as can be borne; this washes out the *débris* and does much towards cleansing the root.

I know that some of my brethren condemn the use of the root-drills as needless and dangerous, but I find them most efficient if used with skill and judgment, always taking the largest sizes *first* to avoid breaking. For the sterilization of the canal I make use of the various disinfectants, bichloride of mercury, peroxide of hydrogen, peroxide of sodium, etc., as seems to be indicated. For

the past two years I have made much use of Schreier's preparation of kalium-natrium, and with great satisfaction. Where the canal is filled with exceedingly putrid matter I often apply it before making any attempt at removal. This renders the operation much less disagreeable. My experience with this preparation has been that it is one of the most efficient and expeditious that we have, its action as you know being almost instantaneous.

Having the canal clean and sterilized, I think it makes not much difference what antiseptic is used for further treatment; there are many good ones in common use. I rely mostly upon oil of cinnamon in conjunction with the root-dressing devised, I think, by Dr. Lord.

I omitted to mention the use I make of the Evans root-drier in the sterilization of root-canals. It is exceedingly valuable in this respect. I think no one has spoken of it except Dr. Jarvie, but it should be in general use. Through its flexible silver point one can safely heat the canal so as to destroy any germs that may be present.

I have made use of the method spoken of by Dr. Jarvie in some thirty or forty cases, and so far am much pleased with the results.

Dr. Hill.—It is rather pleasant to hear our most eminent men agree very nearly in the treatment that most of us use, and it shows that we have brought down the treatment of pulpless teeth in various forms pretty nearly to one that we all use. I would like to tell my experience with drills, but I have not used them. Where I did not want them they were very useful, but where I really wanted a drill, and ought to have had one, I could not have made use of it, for I never could find a straight one that would bend and go around a corner. I do not want to be misunderstood. I have not in twenty years been without sulphuric acid, and I do not think I have ever treated an abscessed tooth without sulphuric acid, 20 to 50. Dr. Callahan's idea is a different method. I have never tried it. After treating diseased roots of teeth where there have been abscesses, there is always trouble in such cases, and you want to get to the end of the root. I clean out a root with five or six fibres of cotton on a broach, allowing the cotton to extend one-half to three-quarters of an inch onto the broach; then I turn it right around the broach until I have a perfect screw made of cotton. Make it small or large, but work onto the end of the root until you have it very small, and you can get every particle of foreign matter out of the root. Take an abscessed tooth, and if the root is decayed put a forty-per-cent. solution of sulphuric acid there, and the odor is

something awful. You can clean it out with soda or warm water as you choose. Where there is an abscess on the root I always pump that through. If the processes are diseased at all, it will hasten the death or dissolve what is there. I have used sulphuric acid in that form ever since Atkinson first introduced it. I have tried to find the date when it was first introduced, and I think it was by Lister in the London *Lancet* some time in the seventies. When Callahan's treatment came out I was surprised that more dentists did not use that method. There is nothing that will clean out a root so nicely or thoroughly as that. I am one of those who never fill a diseased root at the first or second sitting. At one time I used peroxide of sodium to have it work out through the dental tubuli.

Dr. Merriam.—I have been lately experimenting in rather a large way to see what we could do in the improvement of instruments by beginning at head-quarters. I wrote to one of the large steel firms in regard to music wire, and had them make for me that wire in octagon forms. It is of such temper that it can be readily filed and flattened without changing the temper in any way. I brought some of this steel with me to New York and left it at Schmidt's. They made a few instruments for me this afternoon, and if you will accept them as a report of progress I should like to show them to you. I would speak also of the milliner's needle. It is very long and narrow and the tapering is very slight. The temper can be drawn as stated by Dr. Perry, and, fitted into a round handle, it makes a nice instrument for exploring. They can be obtained in very small sizes indeed. The steel wire I spoke of can be made into the various forms that a dentist wishes. One of the ideas I had was that the small octagon would do away with the present strain; the force used is often too much for the point.

Dr. Turner.—I think it would be well to call attention to a method of filling root-canals recently introduced by Dr. Van Woert. It consists of filling them with paraffine and iodoform. Dr. Jarvie spoke of Dr. Van Woert's method of treating the canals with the Evans root-dryer. After the canal is dry some of the paraffine is introduced into the cavity around the copper wire that extends into the nerve-canal, and the heat from the Evans root-dryer melts this immediately, and by capillary attraction this runs into the root-canal and fills it absolutely. The wire is withdrawn while hot, and the paraffine remains in the canal.

Dr. Hill.—Of course, everything that Dr. Perry reads is almost

perfect. I am delighted with the paper, and I am not at all surprised at its being so perfect coming from him; but I wonder why Dr. Perry made such a preparation of handles on the broaches. Swiss broaches come from the size of a hair, and run from about two and a quarter inches up to five inches long. I have never used anything else. I never had a Donaldson broach or any of the others in my office. Up to a very few years ago I barbed all my own broaches. Take an instrument two and a half inches long, say nearly an inch of it being handle, and for all purposes of putting on cotton and rotating it, it is far preferable to having an extra handle on it. If I understand the broaches as I see them there, you can just as well have the long ones. I find fault with Dr. Perry's way of drawing the temper. He puts the instrument in a glass-tube and draws the temper equally. I think that is a mistake. You light your little lamp, hold that just above the guard which is on it, commencing just at the end of the broach, anneal it just enough to get the blue, and you can draw the temper of the broach perfectly, having the broach stiff near its handle, and at the sharp end you can have it perfectly pliable. I have nothing whatever to say in regard to filling roots. We all do about the same thing. Nearly all of us use chloride of zinc in some way. We may have different ways of applying it. In filling the roots Dr. Perry has the gold wire, which is undoubtedly a good thing. Just as good a thing, or better, is to wind the foil on a fine broach, then pull your foil a quarter of an inch beyond the end of the broach and roll it in your fingers, and you will get as fine a point as possible. For all incisor teeth it is a very good way of filling. There is nothing better for a single-rooted tooth than gold; in that way it can be done very readily. I must congratulate the Society upon getting these various opinions together in the form they have. It is very valuable. I do not think it has ever been done before in any society. This ought to be somewhat conclusive in regard to the matter of sterilizing the roots of teeth and filling them.

Dr. Perry.—Dr. Maynard had a strong preference for wood handles on all his delicate instruments. He claimed he could have more delicacy of touch with a wood handle than he could without it. It may be that unconsciously I have imbibed a little of his feeling, and for many years I have had my instruments made with the handles of a light kind of wood. I was aware that there were broaches made with longer handles than these. I use many of them without the handles, of course. I do not use them with the wood handles in all cases. There are many operations far back in

the mouth where you often need a little handle on the instrument. There is nothing original claimed in reference to those broaches or their use, and as for filling the canals with gold on the end of the broach, you have all done that I suppose. I abandoned that many years ago for several reasons, because it takes a great deal of time, and after it is all through you have a filling that you cannot get out, and it is not an antiseptic material. It may happen that you may never want to take it out, but perhaps you might want to do so, and then there would be trouble. I will defy anybody to fill these little roots with more success than can be done with these wires. That is a great deal for me to say, but I feel sure that I get that little point of gold right down to the very end. I carry with it just enough sterilizing matter to fill up the space and check the trouble at its very seat. You must have some substance to carry before the instrument to get it tight. I know it is perfectly practicable with these little points of gold, for they are prepared in a moment. You can have them on hand, pick them up, moisten them with chloro-percha, and it is done in an instant. I do not care what you use, whether it is chloro-percha or oxychloride of zinc, or this preparation of Dr. Van Woert, which Dr. Lord has used so long, but you are very liable to forget that in those closed ends you get the air in, and think you have filled them and you have not.

Dr. Hodson.—I was just about to speak of that particle of air. I am accustomed to using chloro-percha with the gutta-percha points following, and employ the same capillary principle of which I previously spoke, by first filling the canal with clear chloroform, or with so little gutta-percha in it as to be *as limpid as the clear chloroform*, and then placing a very tiny, smooth broach wet with it in the nerve-canal and reaching to its end, being sure, of course, that an opening is left along the side of the broach so that capillary attraction can act. I drop the chloro-percha at (not over) the entrance of the canal, and the capillary attraction, acting both over the wet broach and the wet canal, carries it surely to the end of the root. I am certain of that by the pumping process proving it. Then I insert the gutta-percha point and carry it gently but quickly to its seat in the canal, as before stated.

Dr. Jarvie.—In the answers from different gentlemen the use of certain waxes is advocated. I think the process described by Dr. Turner is exceedingly valuable. Perhaps further experience may change my mind, but at the present time I think it is the best way we have of filling root-canals. The method is to prepare a piece of

copper wire small enough to penetrate the finest root-canals and graduated in size to fit them. Fill the cavity of decay, or put into it a sufficient amount of paraffine mixed with iodoform. Heat the bulb of an Evans root-dryer and let the protruding end of the wire enter the hole in the bulb. The heat is conducted to the extreme end of the wire, and the paraffine is melted. Draw out the wire and capillary attraction will draw the paraffine into the space left vacant by the wire. You can see the entire process by experimenting with glass tubes. It is marvellous how the wax will fill up the space previously occupied by the copper wire. You can make the copper wire as fine as the steel wire, but of course when it is very fine it loses heat quickly. You must have the wire according to the size of the root-canals. I think the system of Dr. Perry for the fine canals is very good, indeed, but for the larger ones I think this method of Dr. Van Woert is better.

Adjourned.

JOHN I. HART, D.D.S.

Editor New York Odontological Society.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

A REGULAR meeting of the Society was held March 9, 1895, President Peirce in the chair.

Owing to the late arrival of the essayists, the president called on the members present for incidents of practice. In response Dr. Jeffries said,—

I would like to speak of a gentleman who had suffered for about eighteen months with neuralgia. He had been to his dentist a number of times and had his teeth examined to find out, if possible, the cause. In this emergency the upper wisdom-tooth on the painful side had been taken out. That was the history when he came to me to see if I might give him relief. There were no cavities or dead teeth on the affected side, but a broken root of the extracted wisdom-tooth remained, which I removed.

In sounding the bottom of the old socket I detected the crown of a tooth opposite the posterior buccal root of the second molar. I endeavored for half an hour to extract it without losing the second molar. Finding this impossible, I took out the second molar, and then without difficulty extracted a second wisdom-tooth that was lying on its side with the crown surface pressing against the

roots of the second molar. The gentleman was cured of his neuralgia.

Dr. Peirce, the president, then related the following: A somewhat analogous case was that of a lady of about forty years of age, who had been wearing an artificial denture for eight years. A tumor appeared, which grew to some size, and the patient suffered considerable neuralgic pain. I made an incision in the tumor, and took out three teeth impacted together. One was nearly normal size, the second much smaller, and the third was very small. Relief was afforded after these were taken out.

They were located on the right side of the upper jaw, and a hole had been cut in the plate so as to give room to the tumor.

The larger one, which alone could be classified, appeared to be a third molar; the other two were much smaller and could not be designated as any particular tooth. The operation gave entire relief.

Dr. B. Holly Smith read a paper entitled "A Plea for Moderation."

(For Dr. Smith's paper, see page 547.)

DISCUSSION.

Dr. Henry Leffmann.—I am not prepared to differ very seriously with the paper, but I am not entirely in accordance with some of its statements; I mean as to the value of a college education, what we may call, for want of a better term, classical training. The value of this training in its bearing upon professional work is a very difficult thing to determine, and we have very incomplete data upon which to form a judgment.

It is undoubtedly true that genius asserts itself in a variety of ways, and that very able men have passed into the profession without much preliminary training, but I think we must look at preliminary training in its selective effect. Some years ago Dr. Pepper, in a paper on medical education, made a very wise remark. He said that a preliminary examination might be of value in deterring unworthy students from entering the college, as the mere mention of requirements might be sufficient to keep out certain incompetent persons. Appearing before the community as a profession, it is important that the merely practical phase ought not to be given too large a place. Dentists want to be more than simple repairers of teeth and manufacturers of artificial dentures; they want to carry a degree which is a degree of honor; they want to take rank as educated men, and so the colleges ought to insist upon

some preliminary requirement other than those merely of the lowest school grade. Of course, the colleges do not pretend to take men who are not familiar with reading, writing, arithmetic, and some fair knowledge of the phenomena of life; but I recollect in my early days, when I was acting as quiz master, having a gentleman in my class who did not know the nature of a decimal fraction.

It seems to me that we might at least insist on some kind of a high-school education so that our students might be capable of understanding the more difficult departments of science which are laid before them. There is in the minds of many persons the thought that dentistry may be before long a specialty of medicine, and that a medical degree will be required as part of the dental degree. If so, we shall certainly have to prepare the profession for that expansion.

There is one thought that struck me, which is in reference to the question of the poverty of students. I think our charity at times is a little too wide in educational matters. When it comes to providing men with means for making their living, I question whether the State and college is not going too far in encouraging those who are simply unable to pay their way. It may be true, in rare cases, that some valuable minds may be lost to the profession, but in such cases I think the qualities will be such as to attract private assistance. A part of a good education is the money it costs, and my experience, which extends over twenty or twenty-five years of work in several collegiate institutions, leads me to believe that the assistance which is given in colleges to fit the student for professional life is often badly placed. Very often it brings into a profession some one who is better fitted for a humbler calling.

As to the extension of the dental course to four years, I myself am not in favor of it, but I think that what we want to do is to raise the preliminary requirements very decidedly; have some system by which we may gather together in the lecture-room a class of students who are thoroughly capable of appreciating the work that goes on before them. It is a very easy thing to say that a man may be a good dentist and yet not able to read Latin, but at the same time, in the course of his study of Latin and other collegiate branches, his mind becomes developed so that he makes a better dentist. I once said to a chemistry class, in explaining a difficult problem, that probably some great medical man (I gave his name) did not understand the subject upon which I was lecturing and was

no worse practitioner for it, but that at the period of his student life at which he would have been expected to know the abstruse point he would have known it. While in after years a person may not be able to construe a sentence of Latin, yet in his work as a practitioner he will be better developed and better able to do the work of the profession if he has construed such sentences in his student days.

Dr. Bonwill.—If I had been obliged to understand Latin and Greek I would never have been a dentist to-day, although it is a splendid thing to know them in order to understand the derivation of words if for nothing else, but a man must have mechanical genius.

There should be no extension in the period of tuition; with a man of genius it becomes unbearable. Only by getting into actual work and coming in contact with older practitioners will he be fully equipped to do his work. Further, there should be no such thing as a post-graduate course, as the colleges are supposed to have the best teachers procurable, and in setting up a post-graduate course it is a reflection on the present institutions of learning.

Dr. Smith.—I thank the gentlemen for the courteous treatment of the paper. I was well aware before the paper was presented that it would meet with opposition. I know that the gentleman who discussed the paper at some length has the popular side of the question, and I do not desire to take any further issue with him than is taken in the paper. My claim and my position was that we may rest upon our oars and that we do not force in any immoderate way the good movement already started. I do not think any gentleman in the room will charge me with desiring too low a standard in the dental profession. On the contrary, all I have ever said or done has been in the line of progress. But there are many incongruous and inharmonious plans and suggestions offered as to the education of dental students, and it is with the view that some harmonious conclusion may be gotten from them that this paper is presented to you.

Dr. William Shaw Twilley, of Baltimore, Md., next read a paper entitled, "The Census of 1890 and the Dentists."

(For Dr. Twilley's paper, see page 551.)

DISCUSSION.

Dr. Richard Grady.—As Dr. Twilley has said, one of the census enumerators waited on me in August, 1890, and on the 1st of September, 1890, I published in one of the Baltimore papers an article

entitled "Are Dentists Manufacturers?" I took the ground that everything which the dentist makes in his practice is surgical; that a filling is surgical. This matter had been gone over many years ago in the census of 1880. The head of the census department at that time was General Walker, who is now and was then president of the School of Technology, Boston. He was also editor of the report of your International Exhibition of 1876, and chief of the bureau of awards. In this very book the work of dentists was classed as purely surgical, and it was so classed not by dentists but by surgeons.

I represented in 1890 that the dental surgeon cannot properly be subjected to annoyance and investigation in respect to his professional work any more than the surgeon in other specialties of the medical art; that he stands in delicate and confidential relations to his patients; that the demand for reports from dental practitioners was novel and unjustifiable; that the superintendent of the census of 1880, after correspondence, determined to omit "dentistry in all its branches" from tabulation, and caused all schedules on file to be endorsed to that effect and returned to their respective makers.

The word *surgery* denotes handwork in connection with the art of healing, whether manual or instrumental. I stated that so early as 1876 the surgeons classified the following specimens as purely surgical: "Pivot teeth, dentures, complete and incomplete, with and without spiral springs, the various methods of retention by atmospheric pressure and by clasps, and a series of orthopædic apparatus for the correction of congenital malformations of the palate, loss by scrofula, and syphilitic necrosis."

The appliances made in the operating rooms and laboratories of dentists, which the census office of 1890 claims as "mechanical," are made only after examination of the patient, or casts of the parts for which the appliance is needed. In some cases, teeth or soft tissue require removal in addition. When the appliance is finished it is useless and of no value except to or for that particular patient. These appliances are thus surgical. They are the result of diagnosis, prognosis, and handwork.

No schedule was left with physicians and surgeons. Why, then, should dental practitioners be called upon to give information in regard to the personal treatment of their patients?

In reply to these questions the census office said, writing to its agent at Baltimore, September 18, 1890, "In reference to mechanical dentists, you are informed that the term is considered by this office to embrace all branches of the profession except the ex-

traction of teeth, and should be so reported on General Schedule No. 3."

I took exception to that definition. Time went on, and the census office, in October, 1890, wrote to your Philadelphia County Dental Society giving another definition of *mechanical dentistry*,—namely, "That branch of the profession which includes the manufacture of artificial dentures, such as crowns, plates, and caps." The census office was also in error in claiming that at the census of 1880 opposition was uniformly withdrawn when proper explanations were made to the persons averse to giving the information required.

The facts are that the superintendent of the census of 1880, in deference to a general protest, determined to omit from the tabulations dentistry in all its branches.

On December 30 the census office decided to order the census officials to demand answers to all inquiries, and to prosecute those who should refuse to comply. Mr. Williams, a special agent of the census office, said to a *Sun* representative that the same questions that the Baltimore dentists objected to were being put to the dentists in other cities, and willing replies were being received every day. Determined not to let such an official statement go unchallenged, I wrote, "The iteration and reiteration in Washington that the dentists of Baltimore alone resist the purpose of the census-office inquiry is untrue, as the Philadelphia County Dental Association has unanimously adopted resolutions instructing its members not to attempt the impossibility of making any returns, and has presented its protest at Washington."

Now, I would like to show you gentlemen how correct you were in taking that stand. I don't know whether you are familiar with the Extra Census Bulletin or not; I never saw it until last night. In this bulletin this acknowledgment is made: "A large number of reports were received from dentists which purported to represent only the mechanical work, but it is evident that in many cases operative dentistry had been included. This fact, combined with the strenuous objection on the part of the profession to give any information whatever of the character required by the census schedule, on the ground that the census law does not seek to secure the returns for professional services, caused the office to discontinue its efforts to obtain further reports for the mechanical branch of the profession. The statistics published are those which were secured prior to the objection referred to."

I grieve to say that just when this news of hope afforded un-

paralleled opportunity for success, the public press, January 14, 1891, announced from Washington that "Baltimore dentists answer willingly," and that Mr. Williams, special agent of the census office, "believes the entire difficulty is ended and that the dentists of Baltimore no longer hesitate about furnishing the desired information." This was partially true. Nothing could have been more startling than the sudden admission of a committee of some Baltimore dentists that it was for the good of all concerned that practitioners should furnish the information which the census office desired. A feeling of depression, if not of indifference, followed the division of sentiment in Baltimore.

I answered this publication as follows: "In reference to the paper signed last week in Washington, the three dentists who signed the paper at the census office did not voice the sentiments of the incorporated bodies of the city and State, the Association of Dental Surgeons of Baltimore City, and the Maryland State Dental Association, which have unanimously adopted resolutions declining to make returns, which resolutions have never been rescinded, and that the president of the Philadelphia Dental Society has written under date of January 16, that 'the society has no intention of receding from the position taken.' In no case that I am aware of has any member of the Society filled out a blank of the manufacturers census since the passage of the resolution."

In three weeks after my communication the error was atoned for, since Lawyer Venable gave as his opinion "that there was no penalty for refusing to answer the questions, and the dentists might either ignore the whole matter or answer generally that they did not operate manufacturing establishments."

So matters rested until the Willcox Bill was introduced in March, 1892, when I wrote the following, which was unanimously adopted by the Maryland State Dental Association, May, 1892:

WHEREAS, a bill has been introduced in Congress, which provides that any person who shall neglect or refuse to give information to census officers shall be subject to a fine not exceeding ten thousand dollars, to which may be added imprisonment for a period not exceeding one year; and whereas, the public press reports that the bill referred to "will be used in the nature of thumb-screws and spiked boots to enforce replies," and further, that "dentists of Baltimore who by their refusal to answer certain questions will be the first victims of the inquisitorial machine if the bill is passed," therefore,

Resolved, that this Association reaffirms the resolutions unanimously passed November, 1890, protesting against the action of the census bureau in classifying dentists as manufacturers.

Resolved, further, that the chairmen of the several standing committees as

now constituted, be appointed to convey the sentiments of this Association to the Senators and Representatives of Maryland in Congress, and urge them to have the Willcox Bill amended, so as to omit dentistry in all its branches from the tabulations of the census.

Dr. Thomas.—History wants to be correct in all its bearings, and the history of the efforts made by that committee is not correct as it stands to-day, so I am very glad that Dr. Twilley, of the committee appointed by the American Dental Association, is making an effort to establish facts upon the correct basis.

As it stands to-day, any one who reads the report would think that 1892 was the beginning of the effort to establish the standing of the dental profession, and that Dr. John B. Rich was the man who did it; but as Dr. Twilley says, two years before, in 1890, the effort was made by the Baltimore men, Drs. Twilley and Grady, and others, seconded by Drs. Boice and Faught of this city. They did not succeed, however, in arousing sufficient interest in the dental profession, and the proper stand was not made. Later on committees were appointed by various societies over the country who should go to Washington and attempt to defeat the Willcox Bill. I happened to be the representative with Drs. Faught and Deane selected to represent this Society.

In my address before the Senate committee, I said that the dentist, as an individual, did not by any means consider himself better than a manufacturer, but that the law required more of a dentist than of a manufacturer. The dentist was compelled by law to be an educated man and to have a diploma from a reputable college, while a manufacturer need not be able to write his name. Therefore, in the eyes of the law, the dental profession was on a higher plane than the business of manufacturing. But that was not the point of our argument. The fact was that dentists really manufacture nothing. Everything that comes to their office is already manufactured.—teeth, plates, screws, etc.,—and they simply take them and apply them to each individual case, and the denture has no possible value except to the individual mouth for which it is made. That point carried the day. Senator Eugene Hale said, "You might as well call a physician or surgeon a manufacturer because he fits a splint to a broken limb."

Dr. Faught.—Dr. Thomas has referred in his remarks to the fact that this history has never been correct, and it is very essential for the future of the profession that this history be intelligently written and accurately stated. We are all aware that the American Dental Association has appointed a committee to take

steps to do this, and therefore it is essential now, before the meeting at Asbury Park next summer, that all the facts be brought out in the local societies.

One thing I want to say by way of correction to Dr. Thomas's statement, that the efforts made prior to 1892 had not carried the profession with it. That is not exactly the case. There were not two separate efforts, one beginning with my work in 1890 and extending up to 1892, and another taking inception in 1892 under the direction of Dr. Thomas. The work which was done by me, largely as an officer of the Philadelphia County Dental Society and partly as a member of the Odontological Society from 1890 to 1892, certainly was not a popular movement, but it required courage on the part of the few, and owing to their steadfastness and aggressiveness the foundation was laid for the successful culmination under Dr. Thomas in 1892; but I deemed it unnecessary to go to Washington, as my ideas were already before the Census Bureau in writing, while Dr. Thomas, too, being there (for the first time), could command attention with new facts.

On October 20, 1890, I introduced the first set of resolutions opposing the census classification to the Philadelphia County Dental Society, and at that time it met with bitter opposition. I remember how Dr. Boice said we were going into a pretty big fight; that we would have a great deal of trouble and take a good deal of time and expense to successfully contest the matter through the courts, and we would probably be mistaken if we expected to have the support of the profession. I insisted, however, and Dr. Boice withdrew his opposition and voted for the resolutions. The resolutions were adopted, and then on November 1 I came to the Odontological Society and introduced similar resolutions under threats of the Census Bureau. Those resolutions were afterwards rescinded by this Society, in so far as they controlled the individual action of the members. I was absent at the time. At the next meeting I again insisted, and the resolutions were again put on the minutes. In the mean time the census agent told me the resolutions had been rescinded, and I told him to go look at the minutes and he would find they were still there on the statute book, and he so found them. Then it was I went to Baltimore May 2, 1891, and afterwards up to Albany. Then the movement had become popular throughout the country, and you appointed the Thomas committee, which brought to a satisfactory conclusion the effort which the few had so pluckily striven for so long.

I do not want it to go on record and be understood that all

the work which led up to it for two years was for nothing, and that the result was obtained without this battle. There was bitter opposition for two years, and it was only by the persistent action of myself and the few others that the matter was kept agitated and the result finally obtained at Washington in 1892.

Editorial.

DENTAL TRAINING.

QUESTIONS of dental education are occupying much attention in the journals and dental society meetings, especially at our annual gatherings, and are often treated from a narrow and erroneous point of view. There are those—usually who know little or nothing of practical teaching—who feel that they are annually called upon to assail the dental colleges and their methods of instructing; others calling for difficult entrance examinations. Some would have it so high as to exclude all who have not a classical education, etc. Such examinations many of these advocates would themselves utterly fail in were they put to the test.

The school which requires a rigid entrance examination and has a large faculty, teaching a great variety of subjects,—all of which may be good in their way,—may fail to graduate students who will make successful practitioners. Its students may have what Professor Gross designated as “photographic memories and microscopic brains.” They may be store-houses of dental and medical theories, and yet fail utterly as practitioners, and never contribute a single fact to the advancement of their profession. As the *Journal of the American Medical Association* says editorially, upon the subject of professional education, “Many writers use the term medical [or dental] education, as if it were something complete or finished. Diplomas are often considered as evidence of this, and are offered as guarantees of scientific skill.”

These are sad delusions; a medical or dental education, we may say, is never finished, and the true aim of our schools is, or should be, to train men to observe and to think for themselves, not to overload them with theories. The mere memorizing of the facts which are seen by the microscope would never make a practical

microscopist; and this holds true in any other channel of scientific work. The assumption of truths without personal examination, and the inability and want of training to examine independently, is too often the case. The facts must be sought for, examined, and compared.

The dental school that trains its students to be explorers, to study accurately the various phenomena of health and disease in and about the dental organs, inspires them to be ever on the alert for new facts, or new conceptions of old ones, who are never learned but always learning, is the ideal one.

Students should not be allowed to accept the facts presented in the lecture- or clinic-room by their teachers, and found in their textbook, as conclusive, but should be trained to verify these by personal examination and experimentations. Too often have students, who by memorizing a few facts as given by the incumbents of the several chairs during the lecture course, been given their diplomas with the full right to practice, and to be accepted as representatives of the profession. But dental teaching is each year, through the efforts of the Association of Dental Faculties, being placed upon a more uniform and broader scale. More time is given to the several laboratories and class-rooms, where the instructions are more of an individual nature, and where the student is taught and encouraged in using his powers of observation and reason, and, in making personal experiments, to be accurate and true. Manual training is an important factor in dental education, and those who were fortunate enough to attend the meetings of the National School of Dental Technics, recently held at Asbury Park, must have been impressed with that fact. Dr. E. C. Kirk, an acute observer, in commenting upon this point, says, "The application of the laboratory method in dental education, the introduction of the technic method in our schools, by bringing the instruction in operative and mechanical dentistry and therapeutics into line with the laboratory method as utilized in the departments of pathology, chemistry, and histology, is a most important step towards cultivating a scientific habit of mind, and a desire for original research among the dental students of to-day, which must tend to elevate our standards and ideals, and react favorably upon future methods of practice."

Now that dental teaching has reached a broader and more uniform basis, our schools should require something more in the way of examinations than recitations and the memorizing of facts. The mere gathering and storing of dental knowledge can never make a successful dentist. While no college can educate a man in the true

sense, yet they can prepare him to use his powers of observation and reason; and when a student realizes his limitations and the personal equation of error that is liable to complicate his observations, he becomes a scientist in the highest meaning of that word. Of course all of us cannot be scientific investigators in the broad sense, but, as has been observed by others, it is, after all, a matter of degree, for every one is, or should be, capable of observation, and able to interpret and report such observation.

While many of our colleges are excellent, they have not, as a rule, introduced this matter of personal observation and the recording of same in their curriculum. We have the medical journal referred to above as authority, that an English medical school has recently adopted a plan requiring all senior students to spend a good portion of the last year in observing and writing up cases, the notes of which are corrected by the teachers. In this way the senses and reason are trained to observe and compare the relation of facts,—a move, we think, worthy of emulation. G. W. W.

Obituary.

AUGUSTUS WOODRUFF BROWN, D.D.S.

AUGUSTUS WOODRUFF BROWN, D.D.S., died July 5 at his summer residence, in Manchester, Vt., aged ninety. He was born in Litchfield, Conn., and was thought to be the oldest dentist in America at the time of his death. He practised in New York City for half a century, and retired, with a fortune, fifteen years ago.

He was at first associated with Dr. Solomon Brown, his oldest brother, whose name was one of the best known in early dental literature. In their office, at 13 Park Place, New York City, the first dental society in the world was organized and the first dental journal planned. These were the American Society of Dental Surgeons, of which Eleazar Parmly was first president, and the *American Journal of Dental Science*, of which Dr. Solomon Brown was first editor.

Dr. Augustus W. Brown at one time had the most lucrative practice in New York, and was widely known in social as well as professional circles.

One of the earliest honorary degrees of the Baltimore College of Dental Surgery was conferred upon him.

He married Miss Emma Mandeville, who with two daughters survives him. He had nine children, but none of his sons lived to manhood.

Dr. E. Parmly Brown, son of his brother Solomon, studied with him, and is the only member of the family now in the dental profession.

The funeral services were held at Manchester, and the interment was in the family vault in old Marble Cemetery, New York City.

Notes and Comments.¹

THE DENTIST'S DUTIES TO HIMSELF AND HIS CLIENTS.—Since the first issue of the *Dental Digest*, Dr. J. N. Crouse has contributed to that journal a series of practical papers upon conducting a dental practice upon business principles. In the May number there are some suggestions which every young man should read. Dr. Crouse asks, "Have you always gone to your chair or to the work in hand in the best physical condition possible?" This is a matter of importance; if the hand is unsteady and the eye dimmed, our place is not at the chair. We should avoid excesses, and see to it that our diet is correct, our sleep full and refreshing, so that with a clear head we can "think and reason correctly, and carry out well-laid plans with skill and dexterity."

One of the most pertinent questions asked is, "Do we treat our patients as if they were living beings, worthy of the most kindly care?" It is owing to the neglect of this one point that there exists so much dread of the dental chair. Too often does the operator forget or seem to be indifferent to the fact that he is working upon *living beings* with all the sensibilities he himself possesses.

SYSTEM OF CHARGING FOR DENTAL SERVICES.—In the article referred to above Dr. Crouse makes a plea for all practitioners to

¹ The assistant editor solicits contributions for this department,—new methods, new remedies and formulas, or any short practical note which may prove of value to the practitioner or student. Address 1718 Walnut Street, Philadelphia.

adopt the system of charging by the hour for their services, and not according to the amount of work done. This, to the writer, has always seemed to be a good plan, where possible to carry out, but to expect it to be universally adopted is out of the question; in fact, there are a very few who can do it. The doctor thinks it places temptation out of the way. That is, if it would be better practice to cut down a thin wall between two cavities in the masticating surface of a molar tooth, for instance, this would be done, and one large filling made of it instead of two small ones, to make a better showing upon the bill of items. Now the latter—the bill of *items*—is a much worse practice than making our charges according to the services rendered. The writer has but once done this (then it was requested), as he considers it a step towards retrogression. If a man does not wish to be strictly honest in his dealings, the adoption of this system of charging will not make him so. Our rule, both in deciding upon the practice to pursue and in making charges for the same, has always been the “Golden Rule,” laid down for us centuries ago.

TEACHER AND TAUGHT.—In writing upon this subject, John B. Roberts, M.D., truly says that the faculty of imparting knowledge is distinct from the faculty of acquiring knowledge. To teach is not simply to tell, but to make the statement of fact so interesting and so clear that it assumes a living importance, and is eagerly sought and intelligently retained by the hearer as a part of himself. A teacher must draw bold, clear outlines, omitting details, and repeating essentials until his pupils have a mental framework upon which they themselves may erect more elaborate structures at a future time. He who has not the power to select the essentials and lead the scholar to reason and observe is destitute of the teaching instinct. Then his lectures become mere recitations, as wearisome to himself as to his involuntary hearers. The true teacher furnishes his pupil with compass and chart, no more. The latter must select his route and reach his harbor by the exercise of those intellectual powers which have been given him. It is experience and not memory that has been called the mother of ideas.

THE International Dental Journal.

VOL. XVI.

OCTOBER, 1895.

No. 10.

Original Communications.¹

PYORRHOEA ALVEOLARIS.²

BY DR. J. E. CRAVENS, INDIANAPOLIS, IND.

IN the progress of the lesion or disease known as pyorrhœa alveolaris (Riggs's disease), the only tissue really destroyed is the alveolar process and principally that participating in the septæ; and, save the exhibition of some incidental calculary deposit, there is nothing in the appearance of freshly extracted roots, from affected sockets, that affords the slightest suggestion of the existence or action of the disease in consideration; assuredly, then, the conclusion forces itself upon one that pyorrhœa alveolaris is not, strictly, a dental disease,—*perhaps not a dental disease at all*,—a possible assumption that may be strengthened by the fact that the pericementum is not a participant, but is affected to some extent by some of the results of the disease.

The tract of pericementum involved in a pus "pocket" is not discovered in congestion, whatever may be the condition of the remainder of the membrane in those parts of the socket intact.

Pyorrhœa alveolaris is of itself little more than a condition, a

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the Massachusetts Dental Society at the annual meeting, June 5 and 6, 1895.

result, however, of a periosteitis that finds origin on the surface of the alveolar ridge, and later by extension invades the alveolus; therefore, to study the pathology and seek out the etiology and history of this ostensible disease, one must consider the affections of the periosteum.

PERIOSTEITIS.

The causes of periosteitis usually are not so obscure as to prove impossible of discovery, but there are cases whereof the cause can not be assigned. A surprising parallel to the principal facts of pyorrhœa alveolaris is presented in an extended essay on osteitis, periosteitis, etc., by R. H. M. Dawbarn, in the "Reference Hand-Book of the Medical Sciences," pp. 381 to 385, inclusive.

In the following quotation from his language on the subject, Mr. Dawbarn appears to recognize little clinical difference between periosteitis and osteitis,—viz.:

"It is of little clinical value to classify inflammations of bone into osteitis, osteomyelitis, and periosteitis, from an anatomical stand-point, since primary periosteitis, with exception of the traumatic and syphilitic varieties, is rarely observed."

In the quotations to follow, from the same authority, it is hoped to show to the satisfaction of my auditors, the close application of the pathology and progress of periosteitis to the symptoms and facts of the hitherto mysterious (?) pyorrhœa alveolaris. The double character of periosteitis should be held in mind by students of pyorrhœa alveolaris, as this characteristic plays a conspicuous part in the tragedy of cure. The statement of Dawbarn is,—

"Chronic, non-infective periosteitis may be either fibrous or ossifying. In the former [fibrous] there is much increase in the amount of connective-tissue, and the thickened membrane adheres unusually closely to the bone; in the latter [ossifying] we have as a result an ossific deposit."

Recurring briefly to a preliminary statement of mine, to the effect that pyorrhœa alveolaris is a condition resulting from periosteitis, and that alveolar process is the only structure really destroyed in the progress of the disease,—we may profitably invade the alveolus in pursuit of the parallel where we find a cushion or mass of soft and highly vascular tissue lining the greater limit of the "pocket." This mass is the apparatus of destruction or repair as the case may be. The existence of such a mass of soft tissue is a clinical fact familiar to practitioners who have essayed treatment of Riggs's disease. Destruction of alveolar process and consequent

enlargement (pocketing) upon one or more aspects of the root of a tooth, will continue as long as the mass of granulation tissue endures undisturbed; that this is a fact also of chronic periosteitis is verified by Dawbarn as follows:

"In periosteitis and rarefying osteitis, the absorption of bone is thought by some pathologists to be caused by the presence of certain large multinucleated cells, the myeloplaxes of Robin, called, from this idea, osteoclasts. . . . Other pathologists disbelieve that these large cells possess any such power, and attribute the absorption to the influence of the new granulation tissue always present in these cases and lying in contact with the bone."

Proceeding upon the hypothesis that the real lesion or disease in a given case of pyorrhœa alveolaris is an affection of the periosteum, and that the usual facts and manner of destruction of bone practically are the same in the alveolus as elsewhere, except there be modifications due to comparative density of the tissues acted upon, we may seek the etiology of the disease upon the same hypothesis. The primary manifestation of inflammation in these cases occurs in the periosteum on the ridge and about the orifice of the socket; for descriptive convenience I have called this primary condition *orbicular periosteitis*. Should orbicular periosteitis continue on the surface of the bone, there will be a persistent case of *gingivitis*, which may prove to be serious or may not; but, should the periosteitis penetrate the socket, as it usually will in time if unchecked, then the condition known as Riggs's disease, or phagedenic pericementitis, or pyorrhœa alveolaris, or gouty inflammation of the peridental membrane, or whatever name you may wish it to be known by, will obtain.

ETIOLOGY.

In reference to the origin of inflammation of bone and of the periosteum, Dawbarn gives a variety of causes, nearly all of which are possible in the mouth. As to osteitis Dawbarn says,—

"Inflammation of a bone may be induced by simple traumatism, . . . by extension from a periosteitis, by extension from arthritis, by exposure to cold, or to action of certain poisons, as phosphorus, mercury, syphilis; by pressure, by eruptive fevers, typhoid possibly acting as a primary and certainly as a predisposing cause."

Also,—

"Periosteitis may originate from traumatism, either simple or compound, and in character may be simple [that is aseptic] or septic from the presence of micro organisms."

In the mouth there are not wanting abundant causes for orbicular periosteitis: pressure of a persistent nature, even of so mild a character as that due to salivary calculus being sufficient, if under the margin of the gum; injury by dam-clamps may be either pressure or traumatism, or even both; impinging ligatures, badly adjusted regulating apparatus, ill-fitting crowns and wabbling plates, or traumatic injuries immediately about the sockets, due to any of a hundred and one simple carelessnesses, such as splinters of wooden tooth-picks thrust into the gum tissue; woundings by pins or needles that are used for picking the teeth or carried carelessly in the mouth, a most pernicious habit with many women; and often, far too often, careless and awkward manipulation of dental instruments that probably are far from clean. It is possible that what we recognize as aggravated gingivitis is due to "simple" or "aseptic" periosteitis, while that which is "septic" is responsible for invasion of the sockets and destruction of bone, the formation of the pus "pockets," and other facts of pyorrhœa alveolaris; in either case the disease is local and "non-infective."

PROGRESS OF DISEASE.

As to the manner of destruction of the bone forming the alveoli, the parallel between pyorrhœa alveolaris, osteitis, and periosteitis may again be applied, in the following from Dawbarn:

"It is thought that the granulations [new granulation tissue] evolve an acid. Formerly it was believed that lactic acid was the solvent. Tillmann's later researches seem to show that it is the carbonic acid in the blood which dissolves the bone."

The fact that in all cases of pyorrhœa alveolaris there is notable inconstancy of gingival membrane, not only of that about sockets that are pocketing, but prevailing generally about all teeth in the mouth, leads to an inference that such inconstancy is prerequisite to establishment of the disease in consideration. The inconstancy may be due to any of many things and conditions; the subject may be anæmic, run down by overwork, by dissipation, or as a condition following protracted fever, or illness of any character, all tending to encourage local lesion or disease.

PROGNOSIS.

If inconstancy of gum margins were general and of long standing in a particular case, it would indicate constitutional obliquity extending far back of any observed local conditions. Such obliquity may be either hereditary or acquired; an acquired obliquity usually is

temporary, being amenable to treatment, besides nature is self-asserting in such cases; that which is hereditary offers less encouragement, because seldom reducible by treatment, and nature cannot be depended upon as an ally. Therefore, if there were evidence that a patient had inherited a constitutional obliquity that was manifested in the mouth by this inconstancy of gingival tissue, I should regard the subject as probably difficult to cure of pyorrhœa alveolaris, but not incurable; and that under conditions arising from personal negligence of sanitary care of the teeth, generally by the patient, there might be recurrence of the disease after every evidence of cure. I do not believe that pyorrhœa alveolaris ever is inherited, or that it ever is incurable.

Practitioners generally assent to the opinion that this disease is oftener noted between majority and middle life; however, the infrequency of the disease in old age is accounted for by the frequent loss of affected teeth after middle age, and cannot be justly attributed to a supposed superiority of tissue structure of our progenitors. Within a year I have had under treatment three subjects, two girls and one boy, who were each about seventeen years old; two had Riggs's disease over three years before coming to me, and the other had developed the disease within a year; all badly affected, and difficult to cure because of recurring gingivitis.

Dr. A. W. Harlan, of Chicago, told me of a case in his practice where the patient was but nine years old, and the symptoms of pyorrhœa alveolaris were well defined; so, it appears that neither old age nor youth enjoys exemption from this destroyer of teeth. Observation has convinced me that young subjects are bad subjects; their gum tissue tends to ready recurrence to gingivitis in discouraging frequency, which is the exception in mature years; add to this their frequent lack of appreciation of affairs in their mouths, an indisposition to persist in the treatment even when rendered comparatively painless; and that other fact, that parents so often prove to be poor allies to the dentist. But young subjects may be cured for all that.

Pyorrhœa alveolaris is very erratic; it is not always general in the mouth, but frequently is found about several sockets, isolated from each other by several intervening teeth, and not confined to the same jaw. Within a week I have examined a case of a lady, where the whole right side of each jaw was affected, not one tooth having escaped from the median line to the wisdom teeth. There is no sign of the disease upon the left side of that mouth, and ex-

actly the same condition was observed in that case three years ago. I have a man patient over fifty years of age, who came to me in August, 1893, with a bad case of this disease about the second and third inferior molars; there was extensive outward displacement of the second molar, due to the disease, which brought the crown into false and painful articulation; within two weeks after the surgical operation the crown resumed its proper position, and remains so to-day, doing good service as a masticator. There have been no subsequent care of that case, no return of the disease, and no sign of any other teeth being affected; I saw this case in April last.

Now, as to constitutional treatment of pyorrhœa alveolaris: two physicians' wives were under my care for this disease two or three years since; their husbands essayed to help by constitutional measures, but without appreciable effect. Other cases have come under my observation, and I am convinced that constitutional measures are beneficial to the local treatment of pyorrhœa alveolaris, to the same extent that they may be to treatment of ingrown toe-nails, no less, and certainly no more.

SYMPTOMS.

The symptoms of pyorrhœa alveolaris are divisible into *constant* and *inconstant*.

CONSTANT SYMPTOMS.

Pus always is present in untreated "pockets," but cannot always be demonstrated at once, because of protecting bone, which prevents pressure of a finger effectively.

The mucous membrane overlying a "pocket" is glazed, the gum hard and thickened; the color being modified from red to a violet, particularly that of the festoons.

The *health line* dips towards the effected sockets; just in proportion as health is restored in the parts.

In cases of long standing and numerous "pockets" there is report of feverish discomfort of gums at almost all hours; disagreeable taste emanating about the affected teeth, particularly on awakening in the morning, frequent lassitude, impaired digestion.

These symptoms are not always constant.

INCONSTANT SYMPTOMS.

Frequent lancinating pains in affected sockets; sometimes regional neuralgia.

Slow recession of gum on labial and lingual aspects; a secondary growth of violet tinted tissue from bases of shrunken festoons, between the teeth, rather indicating an early stage of the disease.

Distressing night pains, when abed, sometimes described by the sufferer as a *drawing sensation* in the "pockets;" relief is obtained only by sitting up; this symptom indicates profound and long-standing "pockets."

The teeth become elongated, loose, pushed out of the arch or rotated in position with soreness; the last item indicating congestion of pericementum or periosteum, or both, where there is still attachment that has not been disturbed by the pocketing.

Sallow skin, hollow orbits, languor, indigestion, livid lips, ropy saliva, breath smells of pus.

One must not expect to find all these symptoms at once. I have discovered extensive establishment of pyorrhæa alveolaris where nearly all the usual symptoms were wanting.

DIAGNOSIS.

The diagnosis, of course, is based upon the known symptoms. The observations of the patient should first be ascertained, and the extent to which they comport with stated symptoms should be noted; such information may guide the dentist where usual indications are obscure.

Observe closely for gingival inflammation and sponginess of gum and characteristic violet modification from red, particularly of festoons.

Apply firm pressure with a finger or other means upon the gum at cervix and bases of festoons, and watch for possible expression of pus.

Test all gingival borders with a thin, flat probe, for in many cases the "pockets" are concealed.

Interrogate as to gastric disturbance due to ingested pus, weakness, lassitude, facial neuralgia, bad taste, etc.

TREATMENT.

The object of treatment should be to cure. The first step to that end is to thoroughly cleanse the mouth. Remove all visible (salivary) calculus and polish off ordinary stains. All cavities of decay should be put in good sanitary condition and temporarily stopped with gutta-percha, to remain so until after the treatment shall be completed.

Having located a "pocket" and determined its extent and form, select a suitable instrument and proceed to remove whatever of calculus may be attached to the root within the "pocket." But the operation should invariably be preceded by certain preparatory measures, such as thoroughly douching the "pocket" with water of 140° F., which should be projected into the opening with considerable force. The forcible current and the high temperature of the water will effectually displace all pus as well as any loose *débris* from the "pocket," and the pounding effect of the hot fluid will stimulate receptivity of soft tissues, enlarge capillaries, and permit relief of congestion; this use of hot water immediately causes a whitening of the congested gum, and the patient is apt to report a sense of relief; the promotion of receptivity is advantageously demonstrated by the rapid and almost complete obtundation by cocaine, without hypodermic injection; it is seldom that a patient will submit to a second surgical sitting unless there has been local anaesthesia, and the dentist cannot be excused for failure to at least try to mitigate pain. In most cases the operation may be rendered almost if not quite painless.

Remember that there is not the slightest danger of overdoing the hot-water treatment as a preliminary, an intermediate, and even a final measure.

The choice and care of syringes is an important factor in treating pyorrhoea alveolaris; most "pockets" are impenetrable by the nozzles that come with the ordinary dental syringes, and often it is necessary that the point of the nozzle shall reach the ultimate depth in order to discharge cocaine at the place of greatest sensibility.

Remember that water scalds at 150° F., that 140° F. is as effective as 150°, and absolutely safe.

After or during removal of the *pyonal calculus* from a root, I lacerate the mass of "new granulation tissue" freely, even bringing away patches and shreds of it, together with portions of loosened and folded pericementum that I may discover at or near the apex; the object of this laceration, etc., is to force a change from chronic and destructive form of periosteitis, to the acute and bone-making character that is essential to a cure of the disease and obliteration of the "pockets." Permit me here to revert to language of Dawbarn, already quoted, as follows:

"In periosteitis and rarefying osteitis, the absorption of bone is thought by some pathologists to be caused by the presence of certain large multinucleated cells, the myeloplaxes of Robin, called,

from this idea, osteoclasts. . . . Other pathologists disbelieve that these large cells possess any such power, and attribute the absorption to the new granulation tissue always present in these cases, and lying in contact with the bone."

Before passing from the surgical act to another topic in relation, let me assure my auditors that obliteration of a "pocket" does not always follow a successful operation, nor is such a result essential to a cure; but a partial filling of the excavation is.

LOCAL OBTUNDATION.

Owing to the present limited knowledge of local obtundents, cocaine promises better for this purpose than anything else, but requires extended application to produce desired results; experience has led me to adopt two solutions, one in water, the other in chloroform. Both solutions should be saturated; a poor article of chloroform will dissolve more of the alkaloid than the best, and I am not sure but it makes the more effective preparation. A saturated solution of cocaine in pure water amounts to about two hundred per cent., while a saturation in best chloroform attains eight per cent. with difficulty. The water solution probably is a dangerous preparation to handle in the mouth, and much caution should be practised with it; my method is to not use more than a single drop at a time, if possible, and take precaution that it does not escape about the mouth. This cannot be prevented always, but to guard against harmful effects there may always be at hand a supply of brandy or whiskey with which to lave the mucous membrane of the mouth; the local relief from cocaine is usually prompt and complete from such means, but the stimulant must be held in the mouth until the benumbed parts begin to feel a sense of burning from the alcohol. I presume that a diluted preparation of alcohol of any other flavor would answer this purpose; in fact, I often employ a druggist's bay-rum that is merely a highly flavored preparation of alcohol of fifty-five per cent. strength. The advantage of brandy or whiskey over other forms of alcohol is that it may be swallowed after laving the mouth sufficiently, thus forestalling unfavorable effects upon the brain, which patients are liable to experience after leaving the office of the dentist.

After the surgical procedure, follow immediately with a solution of sulphuric acid, made of one part commercial acid to ten parts of water, the common battery solution. Guard the parts to prevent ingress of saliva until there has occurred a blackening of clotted blood about the orifice of the "pocket;" then dry the clots with

cotton, and protect with a sort of antiseptic varnish called *stérésol*,¹ which must be flowed over the surface of clot and adjacent membrane and evaporated for a minute or two. This *stérésol* is a tenacious dressing for operations in the mouth, and will hold safely for several days if undisturbed by brush or pick. *Stérésol* was mentioned to me by Dr. I. B. Davenport, of Paris, who said that it was used by Dr. Michaels of that city to protect the "pockets" after operations for pyorrhœa alveolaris. Its formula is accessible to pharmacists, and the preparation is compounded for me in Indianapolis for my personal use, and I have found it very effective in preserving antiseptic condition of cases after operations in pus "pockets."

SECONDARY TREATMENT.

After about five days following a surgical sitting, a patient should return for a secondary treatment, which should consist in first washing the parts with water, heated as before to 140° F.; second, increasing the temperature to near 150° F. and continue washing; if any portion of a "pocket" remains open, it should be douched out as at first with a forcible current; but the operator should be careful not to disturb any granular tissue with the end of the nozzle of the syringe. I have found that there is much benefit to be obtained from following this secondary douching with a ten-per-cent. solution of nitrate of silver. This completes the secondary treatment.

As the dilute sulphuric acid sometimes is quite painful, if the effect of cocaine has passed off, and the stains of nitrate of silver are very objectionable and annoying, I have tried to dispense with these preparations, but always to my regret. As to these, I am still hopeful of some satisfactory substitutes, but they belong to the future of this treatment. I should gladly congratulate some dentist of Massachusetts on such a discovery.

Immediately upon a case of this disease coming under my care, I require a discontinuance of alkaline substances in the shape of

¹ *STÉRÉSOL*.—An adhesive, antiseptic varnish, for use in the mouth.

R Shellac, ℥ ix;
Benzoin, ℥ iiss;
Balsam tolu, ℥ iiss;
Carbolic acid-crystal, ℥ iij, ℥ iij;
Oil cinnamon, ℥ iss;
Saccharin, ℥ iss;
Alcohol, q. s. ad Oij.

Digest several days and decant or strain. (Stable prep.)

dentifrices, soap, or medicines, because they encourage precipitation of the salts of common tartar in the mouth, and thus place the treatment at disadvantage. I recommend frequent rinsing of the mouth with diluted bromo-chloralum, which is very cleansing and a powerful astringent; it is a valuable auxiliary; also, I advise the use of pulverized sulphur as a dentifrice, which is wonderfully effective for polishing the teeth, but usually its flavor and dryness render it not very seductive. The sulphur may be discontinued after completion of treatment, but the bromo-chloralum should be continued for several months but in greater dilution; it is very sour.

I always expect a patient to recover promptly and without failure, unless my surgical operation has been hastily and imperfectly performed.

When pus is no longer formed and the disease is obliterated, a case is cured. The dentist cannot make new bone; *a cure is all that reasonably may be expected of the dentist.* Creative economy alone provides for reproduction of tissue.

In conclusion, permit me to say that experience leads me to believe that pyorrhœa alveolaris is non-infective; it is not constitutional, although a tendency to it may be; it is not always symmetrical; it may be associated with gout, but is no part of it; it is often associated with affections of the Schneiderian membrane, and may complicate them, but exists in full vigor after such affections have been reduced; it could not well escape association with nasal catarrh in a country where that has come to be regarded as a test of our nationality.

Finally, pyorrhœa alveolaris is curable, and there is as little tendency to its recurrence as of any other local lesion after cure. The mask of mystery so long worn by this disease has been torn away. I congratulate humanity and my brother dentists.

FURTHER EXPERIENCE WITH BALSAMO DEL DESERTO.

BY DR. W. H. WHITE, SILVER CITY, N. M.

AFTER another year of added experience in the use of balsamo del deserto in dental operations, and at the risk of being judged an enthusiast on the subject, I will say that I had now rather do without any other article of the Dental Materia Medica than this. The

record is still unbroken: I have never heard of a single case of recurrence of apical irritation after I have filled the roots with this material.

I believe the real secret of success with this material is,—

1. That it is soft and permanently remains soft, and that it will adhere to a damp surface. A root-canal is like a tube, and is liable to change of calibre from thermal or other causes. When filled with a hard substance and such changes occur there must form a crack between the filling and canal-wall, or within the substance of the filling, thus allowing septic invasion; but when such a canal is filled with balsamo, the substance of the filling gives without cracking when there is a change of calibre, and when you add its permanent antiseptic and local antiphlogistic qualities and its entire compatibility with tissue of all kinds there seems wanting nothing to be desired for these purposes.

I have discarded the use of the barbed nerve-extractor in cases of recently-destroyed pulps. I take out the bulbous portion with engine-burs, and clean the bulbous half of the root-canal with the Brewer drill, purposely leaving the dead nerve undisturbed in the apical half. After three years' experience I have not known a single case to cause trouble; the absolute immunity from all pain, soreness, neuralgia, and abscess is certainly remarkable in the light of my former experience in such cases.

My usual practice is to fill roots and crowns permanently at the second sitting, or, where I use local anaesthetics, taking out the pulp, I fill permanently, root and crown, at first sitting.

I have a record of one hundred and thirty-eight abscesses cured during the past year. With these cases I have used nothing as a germicide except oil of cinnamon, and have filled all roots with the balsamo. In forty-eight of these cases the roots and, when amalgam was used, the crowns also were permanently filled within thirty hours after treatment began. In seventy-one of these cases the roots were filled on the second or third day after treatment. Many of these latter might have been filled safely within twenty-four hours, but I either did not have time to attend to them or there was no necessity for haste. The only cases found that I did not feel safe in filling within forty-eight hours were those where the canal was so small that I had great difficulty in getting the germicide into the apical space, and those where the apex was necrosed.

I found three cases of abscess during the year that I could not cure,—they all occurred in the same month: they had fistulae with

apex necrosed and a copious flow of thin, milk-white pus. I failed to cure a single abscess in this mouth by any method of treatment, even after amputating the necrosed apex.

In none of the one hundred and thirty-eight cases treated and cured did I inject any medicament into the apical space, but allowed the cinnamon to reach that space by absorption. I made no attempt to remove the dead pulp from the apical third of the root-canal. I dried the canal only so much as could be done with absorbent cotton. I used no escharotic to break up the pus-sac. I found blind abscesses far more amenable to treatment than fistulous abscesses. It was immaterial to me whether the pus was discharged or not. Of course, where the pus discharged through the canal, I would allow all to escape that way that would, and when the abscess had made an opening through the process, I would lance the gum, but made no further attempt to get rid of the pus.

The theory is that it is not the pus-cells that hinder the healing process, nor is it the dead bodies of the microbes, but it is the ptomaines, the excretions of the microbes, that cause the trouble. Therefore, if you use a germicide it kills the microbes and stops the excretion of ptomaines; and let that germicide be one that does not poison human cells, but leaves them in healthy condition, so that they may perform their proper function; then the giant-cells, the scavengers of the body, will quickly devour the pus-cells and the dead bodies of the microbes, and the leucocytes, the builders of the body, will quickly repair the breach.

Oil of cinnamon is too strong a drug to use full strength in the apical space. Leaving part of the dead nerve in the canal, so far from being a detriment, is an absolute benefit, as it allows only minute quantities of the drug to seep into the apical space.

Dentists have been taught so long that it is necessary to evacuate the pus and to break up the pus-sac with escharotics, necessary to clean the canal thoroughly of dead pulp, and to dry the canal, etc., that it is difficult to make them believe that all these processes are not only useless but detrimental.

I have used this material long enough to observe that the dead roots of temporary teeth filled with balsamo del deserto seem to be absorbed the same as live roots are. I believe the giant-cells will absorb a dead root as readily as a live root if there be no microbial ptomaines present to hinder them from performing their functions.

I have been particularly interested in watching the results of using balsamo with amalgam in filling teeth. In looking at the

material one cannot realize its practical benefits. I have gradually grown into its use until I now use it in all amalgam fillings. Balsamo is so attenuant that a very small quantity of it will completely permeate the amalgam and perfectly insulate the several particles of metal, so that such a filling is as poor a conductor of heat, cold, and electricity as cement or gutta-percha. I now use it in all cases of nearly exposed pulp where capping of gutta-percha or of cement was formerly employed.

In recapitulating its good qualities I will say, first, it is more compatible with tooth-structure than any other filling-material yet devised. When a tooth is decayed so that the pericementum is exposed, mix the amalgam with balsamo, and place it lightly against this tissue, and it will remain perfectly comfortable. Any material which can be thus used must be compatible with tooth-structure.

2. I believe it hermetically seals a cavity, which cannot be said of any other filling-material now in use, there being a strata of balsamo next to the tooth that is soft and remains soft.

3. Fillings will require less undercutting than amalgam alone; in fact, they adhere to the walls of the cavity as firmly as cement.

4. When balsamo is mixed with amalgam it causes the filling to be as poor a conductor of heat, cold, and electricity as a cement filling, and is impermeable to the fluids of the mouth.

5. The tooth-edge does not crumble as it does with amalgam alone. I think this is due to its entire compatibility.

6. The filling does not blacken the tooth as amalgam fillings do, balsamo keeping the filling from oxidizing. While it is thought these salts have a preserving effect, still they are not necessary when balsamo is used.

7. It is especially useful in filling temporary teeth where it is necessary to insert fillings quickly, and often without thorough preparation of the cavity.

8. Patients never complain of uneasiness or pain from thermal changes when sensitive teeth are filled with this material. In short, I believe this filling combines all the good qualities of amalgam, gutta percha, and cement, and has a number of good qualities that none of these possess.

When I wish to fill over-exposed pericementum, or where the pulp is nearly exposed, I mix balsamo with part of the amalgam and press it down lightly with spunk folded tightly in the pliers, finishing the filling with pure amalgam. For ordinary cavities I cover the cavity first with balsamo and work the amalgam into this; this forms a pasty mass; when the cavity is half full I wipe off the

surplus balsamo with spunk, firmly rubbing it against the walls of the cavity, then complete the filling with purer amalgam. When balsamo is mixed with amalgam it at first forms an unsightly mass, resembling blue mass in appearance, and shows dark through thin enamel, but after it has been in a tooth a few weeks or months it loses this dark color and the fillings look far better than if amalgam alone were used. Spunk moistened with alcohol used on the amalgam makes a clean, hard surface to these fillings.

The reason I think balsamo preferable to the various alcoholic or chloroform solutions of the gums now in use for lining cavities is that these solutions become hard on exposure to air and moisture. When lining a cavity, if the calibre of the cavity changes, these linings crack and thus allow the invasion of septic matter; balsamo will permanently retain its present consistency and cannot crack,—it is also more compatible with the tooth than these gum solutions.

Among other things for which I find balsamo useful is, first, to relieve pain in the alveola after tooth-extraction, especially where no firm blood clot is formed. A plug of cotton saturated with balsamo put into the socket will keep it free from pain until thrown off by granulation.

2. When an exposed pulp is painful and congested, the pain is relieved and the circulation is restored to its normal condition by an application of balsamo. The relief from pain is caused by anti-phlogistic properties and not by anæsthetic properties. I have thus often relieved the pain caused by arsenical application.

Until lately I thought balsamo a vegetable product, but I have discovered it to be an animal product; an insect uses this material rear its young in the same way as bees use beeswax.

THE THOROUGH REMOVAL OF DEPOSITS IN THE SUCCESSFUL TREATMENT OF PYORRHEA.¹

BY DR. JAMES H. DALY, BOSTON.

Of the vast number of teeth sacrificed every year, it is estimated that as many are lost from deposits as from caries.

That a large part of these losses might be prevented by proper

¹ Read before the American Academy of Dental Science, Boston, January 2, 1895.

treatment on the part of patient or operator, or both, goes without question. Nevertheless, when pyorrhœa exists even in a mild form, to a skilful, practiced eye it is continued and aggravated by deposits; but by far the larger number of operators do not recognize this, and stand idly by and impart the information to their patients that such cases are not curable, and that it is but a question of time when all the teeth will be lost in consequence of the existing state of things. Too true, they will be lost by just such existing facts; but if skilful and care taking cleansing were practised as faithfully as was the filling of caries on the part of the same operators, no such statement would be necessary.

The patient, too, is not altogether free from blame in the matter. In many cases, patients who willingly pay for all other work, look upon the cleansing of their teeth, an operation less pleasant to the operator than almost any other, as of such minor importance that the mass of dentists find it practically impossible to charge anything like a reasonable compensation for their services. Unfortunately, we all have to consider compensation; and no operator, self-respecting, can give that conscientious attention to the case at hand that it requires unless he feels that he is to be compensated by a full appreciation or in current coin of the realm.

The presence of green stain upon the teeth is such an objectionable feature in itself, by its unsightliness, that immediate removal is requested and insisted upon by the patients; but calculi, with its insidious way of attaching itself in out-of-the-way places, infringes upon the tooth-structure in such a gradual way that it is thought to be part and parcel of tooth-substance; and not until in some accidental way a piece becomes dislodged, causing the patient to think a piece of tooth-structure has been broken away, does the mouth receive any attention as regards such deposits, and then, in a great majority of cases, in a very superficial manner.

The thorough cleansing of teeth is not the work of the student, but of the most experienced and careful operator. There is no part of our work that is more important nor where more painstaking and careful manipulation is required. The deposit of nodules of tartar upon the roots of teeth, together with certain conditions of the blood favorable to its development, will cause pyorrhœa; but it is still an open question whether the deposit is the cause or the result of the diseased condition.

Dr. Black says that it is his opinion that any irritation that causes the gum to weep serous fluid will cause this serumal calculus to be deposited.

Professor Miller gives as the cause of pyorrhœa, without any question, three factors,—a constitutional taint, a local irritant, and micro organisms.

Dr. Ingersoll says this calculus—sanguinary is his name for it—is the result of ulceration, and that a suppurative process must precede the formation of the deposit.

Dr. Barrett takes an entirely different view, believing the serumal or sanguinary deposit to be the initial lesion. He believes it to be the result of some special stimulation of the pericemental membrane, and that the deposit is similar in origin to hypercementosis. All, however, agree that, whatever the etiology of pyorrhœa may be, the presence of deposit aggravates and continues it, and that to successfully cope with the disease, every deposit must be removed.

A well-known dentist of Boston, in conversation with me in regard to the etiology of pyorrhœa, said he did not know the cause of it; but he did know that, given the immediate care of a child's teeth from infancy, he would promise that no pyorrhœa would be found in that mouth. The inference was that by absolute cleanliness there would be found no suitable culture-ground for the disease to take root. Wherever patients of mine have been scrupulously clean in the care of their mouth I have had no pyorrhœa to treat, but with the careless it has been a constant fight to keep it in check.

Again I say the removal of deposits is not an easy matter. Suitable instruments are required; they must be of the pushing and also of the pulling kind, and they must be kept sharp, in my opinion, and scrupulously clean. If we but follow the excellent advice and instructions given us in a previous paper read before this Academy by Dr. Potter, there will be no danger of our transmitting disease from one patient to another.

The instruments must also be of such shapes and sizes as will enable the operator to reach every surface of the teeth with little or no harm to the soft tissues, and they must also be small and delicate. By far the larger number of instruments in use by the dentists, as a whole, are much too large, and do more harm by seriously wounding tissue than good in the semi-removal of deposits.

Finally, it seems to me that a thorough instrumentation, combined with knowledge and delicate skill, cannot be urged too emphatically; for if pyorrhœa is to be dealt with in a successful manner, where deposits exist, it is of the utmost importance that they be thoroughly removed.

THE DENTAL STUDENT.

BY WILLIAM W. BELCHER, D.D.S., SENECA FALLS, N. Y.

"She taught the child to read, and taught so well,
That she herself by teaching learned to spell."—BYRON.

No subject in dentistry should command more of our careful attention than that of the student. Some of us there are who refuse to discuss the student as a personal matter, a living, burning issue. Away with him, ye youth of inexperience!

That this is a condition and not a theory that confronts us was amply illustrated in the report of the Secretary of the New York State Dental Society on the enforcement of the law of 1892, requiring every person engaging in the study of dentistry to file with the Board of Censors a certificate of studentship. The Secretary in his report says,¹ "This portion of the law has been of great value in three things: First, in revealing the large number of persons engaged in dentistry claiming to have been students ten, twenty, thirty, and two or three even thirty-five years. Secondly, the enormous percentage in the first district,—sixty-four per cent. of those registering coming from New York City. Thirdly, *the small percentage of those claiming to be pupils of recognized reputable practitioners of our profession.* Out of the one hundred and forty-two students that have actually registered, *eleven* only have preceptors that are members of either the State or district societies,—twelve and one half per cent., and if we were to take the three hundred and seventy-two asking for blanks, the percentage would be still less."

This statement of facts is, to say the least, startling. Only twelve and one-half per cent. of the students of the State of New York are with members of our State and district societies!

It is not claimed that all the worthy members of our profession are society members, but it none the less goes to prove that a large percentage of our students of to-day are either content or compelled to take up the study of dentistry with the "dental associations" and "dental parlors." It also goes to prove that our society members are not doing their duty in this important work, leaving the field to be tilled by the less worthy members of our profession; for it is

¹ New York State Dental Society Transactions, 1893, p. 12.

a fact that the members of our dental societies are the representative men in their section.

Granting the teaching of the "dental parlors" to be *par excellence*, what can you say of the ethics? Association is everything; "like father, like son," is the old saying. When the student has been taught to look at the society with suspicion, that fifty cents is the correct price for filling teeth,—more is extortion and robbery,—that advertising "pays," and a cheap article of dentistry is the proper thing, what can you expect of the future?

"Not for thousands of dollars would I have a student in my office," says one prominent member of our profession. Here we have the trouble. Talk as you may of "legislation" and the "elevation of the college,"—legislation may suppress total ignorance and even empiricism to a degree, but it cannot force mediocrity into thorough competence. The colleges have done much; they can only lead the way; nothing can take the place of thorough office instruction, not only in operative technics but in professional ethics and business methods. The advancement of the profession is in our own hands; to cleanse the stream we must purify the source; to the student we must look for the future dignity and usefulness of our profession,—its further advancement and uplifting. How careful, then, should be the selection of the student! It is unnecessary to say that among the first prerequisites should be sufficient mechanical ability, education, and refinement.

He should be of good morals and character; the public judge you by your students, by the raw material, therefore let the standard be high, as a student of low morals or character cannot help but reflect on your office and yourself.

Take a personal interest in your student,—you will both learn; to my mind it has ever been a question who learned the most, the student or myself. How easy it is to forget! What perplexing questions! but you are expected to know; and it is rather humiliating to confess ignorance of a subject with which you have been and ought now to be familiar; therefore the student is a stimulant, an incentive to review work long neglected and forgotten.

Don't expect impossibilities of the boy; do you not see your own mistakes reviewed before you? It is given to only a few of us to be "born dentists." Save and protect us from some of the specimens we have encountered!

Do not make a playfellow of him; it may be that no man yet was ever a hero in the eyes of his valet, but let that be no excuse for sacrificing your dignity or authority. Keep him in the labora-

tory; he will have plenty of opportunities at college to learn operating; the country is full of second-class operators, but good mechanical workmen are like angels' visits,—few and far between.

Teach him that he must first acquire principles before he can apply them, that the study of physiology is impossible without a thorough knowledge of anatomy.

See to it that he selects a first-class school for his education,—*you* are responsible for this. You may say that it makes no difference so long as he has a diploma. No, indeed! there are colleges and colleges, diplomas and diplomas. The public are becoming rapidly educated; they know the good and the poor schools. Talk with some of your patients and you will be surprised at their knowledge. Graduation from a first-class college is a benefit all through life; one makes associates and acquaintances that are of incalculable value; the better the school the more desirable the associates.

He comes back from college, "simple as a child, green as a salad," to tell you "the latest." How boldly he offers suggestions, ay, even criticism! Deal with him kindly; he will soon see the error of his ways. He is in his own mind a greater man, a better dentist, than he ever will be in the future; disappointments, failures, trials, temptations, and the loss of self-confidence will insure a balance,—they come to all of us. What one finds the world just as he likes?

Youth and new wine each need the mellowing influence of time to bring them to their greatest perfection. Wine is wine, the juice of the grape. Yet time and age do not necessarily bring to it excellence; care, experience, and attention are necessary in its production; so in youth, golden opportunities and natural ability are not always the forerunners of prosperity and success.—age, experience, adversity, temptations resisted, hopes deferred, trophies unwon, all go to the formation of character, life, the crucible; cares, the fiery furnace, freeing from dross, forming true character and manhood.

Give him good advice and, best of all, good example,—not that he needs the advice or will accept it.

Tell him of your mistakes; not that he ever expects to make any, oh, dear, no! It is surprising how little we learn from others; their failures are nothing to us; we are so constituted that we cannot to any degree profit by another's experience. If we only could begin where another man left off: if he might endow us with his knowledge and experience the same as his goods and chattels, how wise we might be!

It has been truthfully said, "There is no royal road to learning;" every man must have the experience of the man before him; after a time comes judgment, ay, even conservatism, if you please.

Time passes, and our young man starts out for himself, only to find that a college education and high-class standing are not always the open sesame to practice. The practical application of principles is not so easy, but, like Antæus of old, rising from each defeat with added strength, the elusive god of prosperity smiles on him. Really, the boy is doing better than yourself. Are you jealous? Not a bit; he is yours,—your creation; you glory in his success and exult in his prosperity. After a time it is supposed you go to see him; how proud he is of his office, of his acquaintances, and the boy actually seems to be proud of you! How prosperous everything appears! Let us hope it is not all on the surface; that he is an exception, a true *rara avis*.—a dentist and a business man.

It is to be hoped he will continue to be a student, to learn what little he may of the boundless store of knowledge; that he will attend the dental meetings, exchange ideas with his brethren, and be superior to the little jealousies which are always marks of the narrow mind, and become the master-craftsman, looking down the vista of time to the twenty triumphs behind him, recalling with pleasure the paths which have led him to fame, and at last, like unto the Moses of old, behold the promised land denied to him, but of which he and his time have been the auspicious pledge,—a professional standing, yet higher, greater, and better, in the age yet to come.

Reports of Society Meetings.

AMERICAN DENTAL ASSOCIATION.

August 6, 1895.—First Day.—Morning Session.

THE meeting was called to order by the President, Dr. J. Y. Crawford, of Nashville, Tennessee, at 11 o'clock A.M.

The exercises were opened by prayer offered by Dr. Hoff, and the President then introduced Dr. Sanger, of New Jersey, who made the following remarks:

MR. PRESIDENT, LADIES AND GENTLEMEN, MEMBERS OF THE AMERICAN DENTAL ASSOCIATION.—In the name of the New Jersey State Dental Association I salute you and bid you thrice welcome to Asbury Park. When the dental student enters upon his career he has but one ambition,—that of attaining to a diploma, and with his fellows he strives through anxious years until the Dean finally notifies him of his acceptance, and his heart is filled with joy. Mr. Chairman, the New Jersey State Dental Society has this year attained to a diploma, the diploma of twenty-five years of usefulness, and a history of which it is proud. To-day, as we look you in the face, we feel we have attained the scholarship prize,—that, representing as you do the intellect and the highest intelligence in dentistry, and honoring us with the privilege of being your hosts, you have said to us, “Well done!” and you have given us the prize. We feel a pride in it, because we believe we have attained a reputation as leaders among those who have sought to make the profession what it is to day; so we are additionally glad and peculiarly joyful as we find this sanction to our work in your acceptance of the invitation to be our guests. The latch-string is on the outside to you, and the greatest reward you can give us is to have your hand often on it, feeling assured that we will gladly greet you and give you what you wish. Again we bid you thrice welcome, with the hope that while the members of this Association are getting new ideas and tools for their professional work, the air of Asbury Park may bring new lustre to the eye, new quickening to the blood, so that in the future you may look back upon this as a beautiful oasis in the desert,—one to which your heart shall turn with delight again and again.

The President.—We have with us to-day a representative of American dentistry in a foreign land, Dr. Bryan, of Basle, Switzerland, ex-president of the American contingent of dentists in Europe, and we should be pleased to hear from him.

Dr. Bryan.—I came here expecting to be an observer, having nothing to do, and to be called on to-day for a speech is entirely unexpected. Our association in Europe has great pleasure in looking up to this society as to its father. It is a much older association than ours. The Society of American Dentists in Europe was formed about twenty years ago, as near as I can remember, on the Rigi Mountain, by Americans residing in Switzerland. They gathered there on the Fourth of July to have a little celebration, and organized the American Dental Society of Europe. It rapidly grew in numbers, and drew to its ranks members from all over Europe, and all

the nations have one or more of its representatives in their principal cities. We meet annually, as you do here, and our Society is now in session at Boulogne-sur-Mer, in France. They charge me to extend to you their greetings, and hope that the members when they wander abroad will arrange to meet with them. We, as exiled Americans residing abroad, are always glad to extend the hand of good fellowship to you, and nothing would please us more than to greet you all. I thank you for the honor conferred upon me, and am glad to be with you to-day.

The President introduced Professor Dunbar, of the Dental Department of the University of California, who spoke as follows:

I represent only a small part of the dental profession in this country, and we are united by only a very slender bond. The American Dental Association has never gone farther west than the State of Missouri, and we feel that we have been slighted to some extent. We are not many in numbers, but we have an active working profession in California. I have hoped in years past that we would have this Association with us. We hope some time in the future you will come over and help us. We need encouragement. We think this sort of assistance is what the American Dental Association can furnish. I thank you for the distinguished honor of speaking for my State and city.

Dr. Brophy moved that the American Dental Association send greeting to the American Dental Society of Europe, now in session at Boulogne-sur-Mer, France. The motion was carried.

On motion, the roll-call was omitted, and the reading of the minutes of the last session dispensed with for the present.

Dr. Crouse, on behalf of the Executive Committee, reported that the working programme of the meeting would be the printed programme which was mailed to the members and distributed, except that for the purpose of accommodating Sections IV. and VII., who wished to illustrate by lantern slides some of their work, Thursday evening would be set aside for those sections. Dr. Crouse also reported about the arrangements he had made with the railroad companies as to the reduction in fare.

The report of the Publication Committee was then read by Dr. Cushing, and was followed by the report of the Corresponding Secretary, Dr. Emma Eames Chase. Dr. Chase also read a letter from the Maryland State Society asking the aid of the American Dental Association and the Southern Dental Association in establishing a dental exhibit in the Army Medical Museum and Library Building in Washington.

Dr. Morgan, the Treasurer, presented the following report :

RECEIPTS.	
On hand last year	\$1159.42
Collection at Old Point Comfort	390.00
Dues collected since	195.00
	<u>\$1744.42</u>
EXPENDITURES.	
Salary of the Secretary for 1893 to 1894	\$200.00
Salary of the Treasurer	100.00
Reporter	125.00
Chairman of Section I.	9.95
Chairman of Section II.	5.15
Chairman of Section VI.	4.00
Executive Committee expenses	33 00
Incidental to the Publishing Committee	1.15
Expenditures for expressage, postage, and stationery	10.75
Columbian Dental Congress	500.00
S. S. White Company, postage, etc., for Transactions of 1894.	88.49
George H. Cushing, for Publishing Committee	60.00
	<u>1137.49</u>
Leaving balance on hand August 6, 1895	\$606.93

Dr. Cushing announced that the following gentlemen had offered their resignations: A. W. Candless, of Chicago; J. W. Palmer, of Pittsburg; and Dwight Smith, of New York.

A motion was made to accept the same, if the gentlemen were clear on the books.

Dr. Cushing read a communication from Dr. H. E. Beach, President of the Southern Dental Society, extending his fraternal greeting, regretting his inability to be present, and inviting all the members of the American Dental Association to meet with them the first week of November, in Atlanta.

President Crawford then read his address, an abstract of which follows :

GENTLEMEN OF THE AMERICAN DENTAL ASSOCIATION,—While I am not unmindful of the compliment you paid me at your last meeting, in electing me to the presidency of this honorable body, I fully appreciate the fact that the great responsibilities fully equal, if they do not exceed, the honor conferred; therefore I hope you will permit me to say that what little I have been able to do towards this grand consummation has been with a view to advance the interests of the American Dental Association.

At the last meeting some work was laid out by the appointment of suitable committees that will come up for consideration at this

time. The committee to have charge of the Horace Wells Memorial Meeting at Philadelphia inaugurated the work by holding a memorial meeting in the city of Philadelphia on the 11th of December, 1894, at which time it was determined by those in attendance that it was the duty of the dental profession to erect a suitable memorial to the memory of Dr. Horace Wells as the discoverer of anæsthesia.

The notable features of that meeting were the two addresses delivered by Dr. Thomas Fillebrown, of Boston, upon the history of anæsthesia and its discovery by Horace Wells, and by Dr. James E. Garretson upon the advantages resulting from the discovery to surgical science. I recommend that the two public addresses, together with a synopsis of what was said at the banquet held in the Union League Building, be incorporated into our annual proceedings and printed as a part of this year's work of this Association.

A committee to act as a joint committee with a like committee from the Southern Dental Association was appointed to investigate the feasibility of bringing together the working material of the two Associations in order to have one thoroughly national body. As the Southern Dental Association has not held a meeting since our adjournment at Old Point Comfort, I recommend that this committee be continued until our next annual meeting, in order that the Southern Dental Association may have an opportunity, if it so desire, to appoint a like committee.

The old question of representation of dental surgery in the medical corps of the army and navy demands an earnest and united effort on the part of our profession, and especially by the members of this Association. As the most important specialty in medicine and surgery, we should demand this recognition by the governmental authorities, first, because it is a necessity to the comfort and well-being of those who bear arms in defence of our homes and institutions; and, secondly, because of the fact that it is right in every particular, and would be a means of ultimately improving the physical condition of the soldiery of our country,—a question of paramount importance in the make-up of an army of defence.

I would suggest that the strongest and best committee be created to investigate the propriety of some inquiry being made in regard to the condition of the mouth and teeth of an individual before obtaining life insurance, as the matter of proper medical examination is of supreme importance in considering the integrity and perpetuity of the life insurance companies of our country. Knowing as we do how destructive diseases of the mouth and

teeth are to human comfort, happiness, and health, it is passing strange that no attention has been paid to the subject in conducting the medical examination of an applicant for life insurance.

Some of our State and local societies are attempting to have more attention paid to dental prophylactics in regard to the scholastic part of our population. I recommend such action by this Association as will further the work in this line. Particularly would I insist that we have some discussion from a dento-mental stand point as to the propriety of regulating the time when a child should enter our public schools for instruction at the expense of the public treasury. Our system of education is sacrificing the teeth and health of our people by putting the child at school at too tender an age. A child should not be put to hard study while he is undergoing the process of tooth-shedding and tooth-eruption. The prematurely created nervous strain upon the child by over-taxing the mind is much more destructive of proper nutrition and physical development than has yet been conceived of.

As another means of instruction and advancement in the practical application of dental science to the masses of the people, I respectfully request that this Association, by resolution or otherwise, ask the medical colleges of this country to create or institute special chairs upon the subject of dental and oral surgery,—not nominal, as many schools now have, but *bona fide* chairs, so that those who expect to graduate in medicine be required to know something of the diseases of the mouth and teeth, and the deleterious influences they have in the impairment of the general health. The objects of the labors of this Association should be to encourage advancement along the lines that promise the most good to the greatest number. The nation's health and longevity is the question at issue, not the making of money by a favored few. The practical application of dental surgery and dental science is a national necessity. Many other suggestions could be made with propriety at this time for your careful consideration, but enough for the present.

I will now call your attention to the subject of my address proper,—ethics. No one question demands more honest, faithful attention at this time than ethics. In fact, the disregard of proper ethical conduct upon the part of men in all lines of business and professions is a serious menace to our welfare as a people. The only difference between commercial ethics and professional ethics is a supposed higher mental attainment of the one class over the other, and the interest involved. Hence the idea of professional men being, in addition to their usual duties, teachers in the highest

and best sense of the most exalted system of ethical conduct, is apparent to the casual observer.

The correction of the many abuses that exist by reason of the disregard of proper ethical conduct cannot be accomplished at once. It must be the result of long and persistent effort on the part of such societies as this, and others of like character in other professions. Some have suggested the invocation of legal enactment by the various States in order to put a stop to the nefarious practice by many of our profession in disregarding the plain teachings of our written code. Such enactments cannot be had until we have a better public sentiment upon the subject, which better sentiment must and can only be obtained by utilizing all the forces along the line of proper education. To make myself clear upon this point, let me state that the pernicious influence resulting from the almost universal habit of the secular press of our country in advertising to the world the innumerable number of patent medicines, without any knowledge of their efficiency, is one of the most glaring and baneful violations of ethical law now in existence. It is not uncommon to see a written testimonial of prominent officials, presidents and professors of universities, giving public endorsement to valueless and even hurtful patent humbugs as medicinal agents for the relief of disease. Ethics in its highest sense teaches the duties of man to himself, to his fellow-man, to his country, and to his God. Every infraction of ethical law is bound to result in injury to some one. Taking this as the proper standard of human action, it is an easy matter to determine right from wrong in the affairs of life. A disregard of the teachings of æsthetics tends to blunt the moral sensibilities, and degrades an individual to such an extent that he is no longer suitable for a high and honorable profession. If the dental surgeons of the United States would unite in demanding the enactment of such laws as would require all men proposing to engage in the practice of dental surgery to observe proper ethical conduct, it would be but a short time before the statute-books of all the States would be graced with laws that would annihilate the quack and the mountebank. As dental surgery is one of the most æsthetic professions, it should be the most ethical in its conduct, thus giving the world a noble example of what it is to do right in all things. As an immediate remedy for the future, I would suggest that all of the reputable schools be requested to formulate a uniform oath or obligation, to which each student shall subscribe before a proper State officer before being permitted to enter a dental college or receive the degree of doctor of dental surgery. Every

violator would be subject to indictment for perjury by the grand juries of our States, which would deter many from wrong-doing. I would further suggest that this be required of the schools before being eligible to membership by representation in this body.

It is my painful duty to call your attention to the fact that some of those who were with us at our last meeting, as members of this Association, have gone to "the undiscovered country from whose bourne no traveller returns." Upon the list are the names of those who have been prominent workers in the interests of the American Dental Association. I recommend that a suitable memorial be prepared and placed upon our record-book in honor of their memory.

Dr. Walker moved that the President's address be referred to a committee to report at a later session.

Drs. Walker, of New York. Crenshaw, of Atlanta, and Fuller, of St. Louis, were appointed as such committee.

Dr. Crouse stated that the afternoons of each day had been set aside for the work of the sections, and the chairman of the various sections announced the place of meeting of the same.

Dr. Cushing moved that all visiting dentists not members of the Association, and all physicians present, be invited to the privileges of the floor. Such motion was carried.

Dr. Ottofy, on behalf of the Committee on Credentials, read the names of the delegates who had presented credentials from their societies.

A communication was read from Mr. Ten Broeck, the mayor of Asbury Park, who regretted his inability to be present, but sent his greetings to the American Dental Association, and presented the freedom of the borough. The same was received with thanks.

Dr. Rhein.—I wish to know if any arrangements have been made for giving clinics before this Association. I would like the information to be given to the Association at this session, because I have been informed by a number of gentlemen that they have been invited to give clinics, and at our last meeting we voted that we would not have any clinics.

Dr. Crouse.—There will be no clinics given before this Association, except under section work. The vote of last year will be obeyed.

Dr. Fillebrown.—I would like to offer the following resolution:

Resolved, That this Association believes the conferring of honorary degrees in dentistry is detrimental to the interests of the profession of dentistry, and this Association hereby expresses its disapprobation of the practice.

Dr. Walker moved that the resolution be referred to a committee of three, to be appointed by the chair.

Dr. Bogue.—I offer the following amendment to that motion: That that committee consist of dentists who are regularly graduated in course from some dental college, and who do not belong to any college faculty.

Dr. Barrett.—I cannot conceive the propriety of that. There are reputable men in the profession who are not graduates, and who have a perfect right to vote on any question which affects the interest of the profession. No question which so deeply affects the whole profession should be sprung upon a body like this without due consideration.

Upon motion of Dr. Stainton, Dr. Walker's motion and the amendment were laid on the table.

Dr. Fillebrown's resolution was then carried.

Adjournment to 7.30 o'clock this evening.

August 6, 1895.—First Day.—Evening Session.

The vice-president, Dr. Watkins, in the absence of Dr. Crawford, who was ill, called the meeting to order.

The secretary read the minutes of the morning session, which after slight correction were approved.

Dr. Crouse moved that the Committee on the Report of the Horace Wells Memorial and the Committee on Census be made a special feature for Wednesday afternoon at three o'clock. Motion carried.

The secretary moved that Dr. Harlan's paper, entitled "Antiseptic Surgery," go over until next year, to be read then as the annual address; but Dr. Peirce suggested that it be read by title and referred to the Publication Committee, to be printed in this year's Transactions, and the amendment was accepted.

Dr. Ottofy, in his report of Section II., stated that forty-eight dental colleges are now in active operation and granting degrees. The transactions of the World's Columbian Dental Congress, in two volumes, appeared last December, and are without doubt most important contributions to dental literature, and no library is complete without a copy of the work. There has been an attempt made to introduce the name "stomatologist" instead of "dentist," and one journal has changed its name accordingly. So far as known to the writer, none of the dental journals have suspended publication during the year. There has appeared a journal called

Dental Digest, which intends to present each month a *résumé* of all that appears in the dental journals of the world, thoroughly sifted, and the most essential and important parts presented to the readers of the *Digest*. If this can be done, it will certainly be a great addition to our dental literature.

The report was received.

Dr. C. W. Stainton, of Buffalo, then read a paper entitled "Ought the Formation of Dental Schools to be limited?" which was illustrated by charts giving statistics as to the number of physicians and dentists in relation to the entire population. An abstract of the paper follows:

Any one who has thoughtfully listened to or read the annual reports of the chairman of this section (Dental Education) for some years past must have observed that regret has been expressed that dental educational institutions are being multiplied so rapidly. Conversation with our most experienced educators shows almost universal concurrence in this view. Are we overdoing the formation of dental schools and the production of dentists? The matter is worthy of serious consideration and study, in order that proper checks and remedies may be used in time to correct this evil, if it be an evil, before it becomes too late. In casting about for some starting-point, some foundation which all will agree upon as fixed and sure, two premises will be acknowledged by all as conceded.

First, that in all civilized countries every individual in the community is a part of the medical constituency. In this the volition of the individual does not govern, but the public welfare will compel medical treatment when the public health is in any way threatened. Every individual, no matter what the color, age, sex, or condition, comes sooner or later under the care of a physician, and constitutes a part of the medical constituency.

Our second premise is that in medicine, which is as old as the human race, the law of supply and demand has long been practically established. There may be more medical men seeking practice than can find it. This profession, like the law and the ministry, is so overcrowded that the survival of the fittest is being constantly illustrated. The number of medical men in any community or country is a fair measurement of the number needed in that community or country.

I have taken a great deal of pains to prepare a table of fifty cities in the United States, including of course all the principal ones, giving the population, number of physicians and dentists, and the average number of inhabitants to every physician and

dentist. This table has been obtained in several ways, largely by correspondence with dentists in these cities. An attempt has been made to procure from many dentists estimates of the percentage of the population in their city who employ dentists, but the attempt has not been very successful. Nobody knows positively anything about it, and many have never given it a thought. The dental ranks are as full to-day in the United States, in proportion to the demand, as the medical ranks. The overcrowding of our ranks in any locality is prolific of cheap practitioners, and the lowering of the standard and character of our specialty.

But can we forbid to any young man the study and practice of dentistry? Certainly not. The raising of the standard of admission to our dental colleges, and the lengthening of the course of study so that it takes as long and costs as much to enter dentistry as medicine, will do much to deter from the hasty entering of dental schools. The multiplication of dental schools is the chief danger in this direction. Half of the medical schools organized in this country have died out, and the experience of our medical brethren ought to be a lesson to us. Dental schools are not being formed now from any need felt for them as an educational necessity. Two impulses now control this matter,—impulses unknown in the beginning,—

First, personal ambition to have a position in and be connected with a dental school for the prominence it is supposed to give; secondly, a purely commercial spirit on the part of medical schools to have a dental department.

The National Association of Dental Faculties ought at once to serve notice "that hereafter no dental school will be accepted, under any circumstances, unless the consent of the Association has been first asked and received for its formation." Would it be too great an assumption of power for the National Association of Dental Faculties to do this? Certainly not. The Faculties Association has proved its character and wisdom beyond the largest expectation. A body which can modify and improve at every point its own interests, constantly bettering the condition of everything it touches with its sceptre of power; that can chastise its own members, no matter how old and intrenched in position,—yea, better, can reach outside its own circle, and correct and punish the unseemly behavior of older institutions who wish to lord it over us; an institution which has done all this without even the smell of fire being found upon its garments need not hesitate to undertake any reform that is needed.

Dr. Louis Jack, of Philadelphia, then read his paper entitled "Should not the Increase of Dental Schools be restricted?" of which the following is an abstract:

There has been a feeling on the part of both the National Association of Dental Examiners and the Association of Faculties that the increase of schools was proceeding at too rapid a pace, and the sentiment was expressed that a greater requirement than additional schools would be an extension of the period of instruction and an enlargement of the curriculum of the colleges already established. A very important condition appearing in conjunction with these sentiments is that the newer schools and those under organization are not being installed with the equipment, the facilities for instruction, the fulness of faculties, and such other instructors as they should have, some of these schools being such in name only, rather than in fact. It may be of interest to explain the value of the diplomas of the unorganized schools. While they have legal value in the States where they are, they give no *prima facie* right to practise anywhere else without examination by the State Boards, and in some States they would not have the privilege of being examined. A manifest tendency of the present period is in the direction of the establishment of dental departments in connection with medical schools. I have no disposition to inquire closely into the motive for this association of dental with medical schools, but we have to deal with a new and dangerous situation. It is palpable that the correct motive underlying all attempts at teaching should be the provision for the fullest and the most varied instruction pertaining to the subject to be taught. In reference to dentistry this now requires an installation far beyond what the ordinary medical schools can furnish.

If the standard in the acceptance of new schools be made as high or higher than has been reached by the most approved among the older ones, the process of levelling upward will then take place, instead of a general lowering of the standing. The dental degrees of America, as is painfully apparent, are being discredited in Europe, for the reason that the preliminary requirements of the students and the curriculum are not sufficiently advanced. This sentiment should be corrected by conforming to the standards which will do this. In case some brake is not put upon the addition of dental schools which are not of high order, the prejudice against the dental institutions of this country must further increase. It must be considered unfortunate that it is a difficult matter in this country to control the establishment or the

conduct of educational institutions. The States have no principle which can be exercised to regulate the quantity of schools. In Europe these questions are carefully governed by the state, which provides laws, grants privileges, and makes rules regulating such public affairs. Here the crystallization of sentiment into law is more lax, and therefore we have to depend upon the development of opinion to assist and support such bodies as the Association of Faculties and the National Association of Dental Examiners in the formation of such rules as shall guard the interest of all concerned, and to aid in checking the degradation of our profession.

Dr. Ottoly.—Inasmuch as Dr. Jack's paper is a reply to Dr. Stainton's paper, I would move that we now hear Dr. Barrett.

Motion carried.

Dr. Barrett, of Buffalo, then read a paper entitled "Whither are we drifting," an abstract of which follows:

Most dentists accept as an axiomatic fact the assertion that dentistry is an integral part of medicine when properly practised, and most physicians promptly admit it. There is year by year a constant extension of the several fields or specialties into which medicine is divided, and consequently the future demand for dentists will increase at a greater ratio than will the population. We now have nearly fifty colleges, each of which is doing something towards extending the field of dentistry. Each will widen its curriculum and broaden its teachings through the natural emulation that must and shall exist. Dentists this year are performing operations and treating pathological conditions unthought of last year. The dentist writes his prescription for and directs the treatment of a large and constantly augmenting list of human ailments. His field has increased a hundred-fold. It is true that dentists have greatly multiplied in number, and we constantly hear from some of the old-time practitioners who have not broadened their practice with the advance of modern ideas that the colleges are turning out graduates at a rate that must soon make their number greater than that of their patients. The profession is growing in importance, and we can easily see the time when there will be fifty thousand dentists in this country. What are we doing towards securing an organization that shall make of them the most effective body of practitioners that the world knows?

The mere desire for the listening to and the debating of scientific papers will never be sufficient to call together any great proportion of our numbers. There must be some other attraction. A considerable portion of those who are at Asbury Park to-day

come that they may renew old acquaintances and enjoy old friendships. It is the hundred or so of these old members who give the main interest to our annual gatherings. When we meet at some extremity of our great country, as at Minneapolis, and draw in a throng of new members, but a few of them continue with us, because the next year they would be compelled to travel a long distance, only to find themselves among strangers. It is then evident that something must be done to promote the communistic side of our meetings. It seems to me this must be done by division rather than by wider aggregation. We should have a number of great societies, meeting annually, with delegates from each of these to form one central association, which may meet at either a fixed point or itinerate among the different sections,—one for the East, one for the West and Northwest, one for the South and Southwest, and one for the transmontane portions of our country. But the American Dental Association has not yet served its full purpose, and I do not propose to abandon it. What can we do to make it more effective?

I hope that the matter will be thoroughly considered this year, and that we shall at least take some steps to improve the social condition; that we shall strive to get better acquainted, and bring less of personal interests to be served; that we endeavor to confine the mercantile spirit to the manufacturers and dealers in dental goods, and discourage it among ourselves; that we shall earnestly and honestly strive to approach the consideration of these questions in a broad, catholic spirit, with due charity for the weaknesses of others, and with the feeling that because our brother does not view matters from our own particular stand-point he is not therefore necessarily an insincere and dishonest rogue.

DISCUSSION.

Dr. Fillebrown (of Massachusetts).—I want to say a few words about Dr. Stainton's paper. The impression is generally extant, I think, that it is within the power of the National Association of Dental Faculties to forbid any more dental schools. We do not have to pay the bills, and we cannot forbid it. A school that came before the Association at this session for admission said, "We have our equipment and we have money enough behind us to make it all we want, and we shall do it." We have no power over them, of course. Look at it from the light of actual fact, and you will give us a little more sympathy. You will not make such great demands. In regard to the num-

ber of medical practitioners, I think the large army of medical men are not considered in this report; consequently there are a great many more physicians to the patient than this table represents. There are a great many more dentists needed. I have not had time to figure out the increase from year to year, but I think it will prove larger than the increase of graduates. The graduates from year to year are not enough to supply the increase; consequently we are not yet overstocked. The propriety of dental examiners examining graduates has been questioned, as though that were a great hardship; that because a man graduates in one State he cannot go into another State without being re-examined. To my mind that is no objection. The State of Massachusetts has a law for lawyers and for dentists, and I think it applies to medicine, that every graduate must submit to an examination by the Examining Board before he can have a license to practise in the State of Massachusetts. Every man who graduates from the law-school of Harvard University must go before the officials and pass an examination. It is a good whip to hold over the schools. I hope it may not be rescinded, and I wish it might obtain in every State of the Union.

Dr. McManus (of Connecticut).—I have been specially interested in the papers this evening, for the reason that I have been engaged in a legislative fight this season. In the State of Connecticut, at the meeting of the last Legislature, a bill passed the lower House to incorporate the Connecticut College of Dentistry. The Board of Dental Commissioners knew nothing about it, and I do not think twenty dentists out of three hundred and seventy-five in the State knew such a thing was to be asked for, or thought such a college was needed in the State. After seeing the announcement in the paper that the bill to incorporate this college had passed the House, the recorder of the Dental Commission and myself went to the State House to see the governor, and talk with him regarding the incorporation of this college. The governor suggested that the bill be returned to the committee and that the dentists should have a hearing. In the mean time our State Society had its annual meeting, and we appointed a committee to appear before the Legislature and ask for a hearing. The Society appointed a committee of three to appear before the Legislature, and that committee invited three of the ex-presidents and some other gentlemen to appear at the meeting. I was asked to present the protest. My protest took exactly eight minutes to read. The same committee reported again in favor of the establish-

ing of this college, and the lower House passed it again. Then we had to go to the Senate. Fortunately on the staff of the governor of our State, Dr. Graham is the adjutant-general, and they listened to him. Through his influence and that of others we managed to prevent the incorporation of that school. We did not want an institution incorporated that in the nature of things could not be a success.

Dr. Stockton (of New Jersey).—Professor Buckingham, whom we all loved and honored, said once to this Association, "We do the best with the material that has been sent us that is possible to do." That may have been true in his day; I doubt very much if it is true to-day. The only point I wish to raise to-night is this: Cannot the colleges of this country turn out gentlemen? If they did, the snub put upon my friend Dr. McManus would never have been uttered. Can there not be some restriction thrown out that a graduate will not put up a sign like this, "Hanks yanks teeth?" That is only one instance, and you know it occurs all over the land that men advertise the best set of teeth that can be furnished for five dollars, warranted to last a lifetime. I claim that the colleges can very largely remedy this evil by at once saying, when the fact is brought to their knowledge, that a man who does this sort of thing shall at once have his diploma withdrawn. He may own the diploma, but they can put a brand upon him that will make it very unpleasant for any man to assume that position. He gets a diploma and hangs it upon the wall, and claims that he is a good dentist and that a good college has qualified him to practise dentistry, and is privileged to do as he pleases. If the dental colleges would put a brand upon such men, all such practices would soon cease.

Dr. Rhein (of New York).—While listening to the paper of Dr. Stainton, of Buffalo, and some of the discussion that has taken place on these papers, it appeared to me as if I were at a meeting of a plumbers' or a central labor association. It does seem that it is a spirit of illiberality that would make us attempt to restrict the entrance of men into our calling. On the contrary, as members of this Association we cannot fail to recognize the enormous amount of poor timber that there is among men who call themselves dentists, and who swell this list of names that is brought before us as practising upon the mouths of patients throughout the United States. How are we going to elevate the character of the profession by putting up a Chinese wall about us and endeavoring to keep out practitioners, as has been done by a

great many States in this country by the laws which have been enacted, some of which will not bear judicial inquiry. To come down to the basis of the figures that present themselves here before us, I challenge the point that they meet the question of supply and demand. The tendency of this country is to increase the general education of the people, and as it increases so will they learn the value of taking care of the dental organs. As it is, the present number of dental schools, with the number of matriculates they have, is totally inadequate to supply the proper number of dentists demanded in the United States at the present time. It is one of the worst blots that can be put upon this Association to go out, either in the public press or before the civilized races, as taking the position that some of these papers do. The question as it presents itself to me is not that there are too many good dentists, but that there are too many poor dentists. That is the question we have to combat. Can we make better dentists out of men who have become wedded to their methods of practice? It is of no avail to prescribe the oath that was formerly administered to every man who received his diploma. That will not aid us among the large mass of men who have their *clientele* and go on year after year destroying the teeth that come into their offices. What will improve dentistry will be the establishing of better dental institutions than we have to-day. It is not our place to find fault with any number of men who wish to found a college and connect it with some university or some permanent institution, and wish to put it upon a plane beyond that of those who are competitors in the field of learning. That spirit should be applauded by this Association, for it is the only way in which better men can be turned out, the only stimulus that will make the other institutions come up to a higher standard of dental requirements.

Dr. Flagg (of Pennsylvania).—The subject, it seems to me, is one of the very greatest moment to our profession. The entire time of this organization could probably not be better spent than by having a full, free ventilation of opinion in regard to this matter. I have not a doubt that the various papers that have been read on this subject this evening have struck upon the mind of those present each in a different way, but all tending towards one direct end. It perhaps would be better not to say one word in regard to this matter, for I am so unfortunately constituted that I almost always stir up contention. I seem to be a sort of firebrand, and therefore it is my disposition to remain quiet until I am not able to do so any longer. As I view it, a house divided against itself can-

not stand. I have endeavored to urge that dentistry with me is first, greatest, grandest, best all the time. Dr. Jack says there is a great danger threatening our profession. What is that? Are we a profession? Are we united in regarding ourselves as a profession? A very few minutes after that he spoke about the ability on the part of certain universities, because of their peculiarities of education and their great facilities in regard to educating our "specialty." It seems to me that there is the rock on which we split. We are all striving truly for the good of our profession. We want a more generally educated profession. We want to recognize that they are gentlemen who are turned out from the colleges. I think a university would be the very thing to educate men for the profession of dentistry, but not through the agency of their medical chemists and the other men.

I do not like to speak of the commercial aspect, because if there ever was a man who went into the profession with a twofold idea, it was myself. I wanted to do what I could for education; I wanted to do what I could in regard to development, and I wanted to pay for it. I want to be paid for what I do, too. There are scores of men like myself who want big classes and good pay, and they want their graduates to be creditable all through the United States and to be able to go before any boards. I rely upon the boards. I took that ground in our Faculty, and when opposition was made that it was rather discreditable that our diplomas should be looked at sidewise by State boards, I said, "It is the presence of State boards that will prevent them from being looked at sidewise." I think State boards are the foundation for the progress of dentistry, and for a man to be examined from State to State appears to be the proper thing to do at the present time. There are many questions in this matter, but they are all centred upon this one thing: that if the medical staffs and the medical colleges still hang on to the idea that this profession of dentistry is going to be elevated as the wiggle-waggle tail of medicine, we will not make any progress.

Dentistry is so great that no one of us is a thoroughly well-educated dentist. I challenge any one to get up and say he knows everything about prosthetic dentistry, from vulcanite work to continuous gum; that he knows every medicine known to dentistry and all about them, and that he knows everything about dentistry from A to Z. If he is here, let him get up, so we can look at him.

Dr. Lenox (of Toronto, Canada).—The difficulty, to my mind, is more with the people than with the schools. We have for years

and years talked about educating the people, but it is a very difficult matter to educate the people. I believe in thorough education of the dentist, and too much cannot be done in that direction. It has been said that men will be graduated from institutions of good standing, and they will advertise to do thus and so, and the people patronize them. Educated dentists will take their stand among educated people, but we find that many we are called upon to treat are not intelligent people. The consequence is that when a man advertises to do a certain thing by the use of a certain article,—to extract or fill teeth without pain,—nine people out of ten will go to that man. Can the people be educated? We have been trying to do it for many years, but it seems to be a difficult matter.

Dr. Bogue (of New York).—I find myself agreeing mainly with what Dr. Flagg has just said. I am asking the question why are these papers read before us at this session this evening. It seems to me that they are read because the Association possesses moral weight. I was deeply impressed by Dr Stainton's figures, as I have been deeply impressed by another fact,—namely, that I know quite a number of persons who are utterly unable to speak the English language with propriety, and yet this year have been made doctors of dental surgery by our colleges. I presume every one in this room is familiar with one or more of such cases. It is in vain for us to apply to the colleges to recall their diplomas after they have been given out, unless a sufficient moral force is brought to bear upon those colleges to do that. This Association is certainly able to exercise an influence of which it does not seem to be aware. Not many years ago, through a resolution, it called into being the Association of Dental Faculties.¹ At the present moment there is in existence an association which, it seems to me, can be slightly directed by this Association, which can have a very great influence upon the questions that have been brought before us, and that is

¹ This is a serious error and requires correction. The National Association of Dental Faculties *was not* "called into being" by the American Dental Association. We are not aware that a resolution was ever passed by this body requesting the formation of such a controlling association, and had it been there was no central power qualified to receive it. The colleges of the period were isolated and very independent, recognizing no law but their own governing Faculties. The Baltimore College of Dental Surgery, under the leadership of the late lamented Dr. Winder, suggested organization to the three colleges of Philadelphia, and at a conference held in the latter city a call was issued, which resulted in the formation of the powerful body known by the above name.—[Ed.]

the National Board of Dental Examiners. Between the National Board of Dental Examiners and the Association of Dental Faculties this question can be settled, but our moral weight as a representative association from all the States of the Union will have to be brought to bear upon those two bodies. If we have a National Board of Dental Examiners with a formulated standard of dental education, then the colleges may safely and properly consign to that board the examination of their students. Then only may the States properly accept the diplomas each of the other. To-day New York has the most illiberal law that I know of. It is a law which I suppose one of the speakers alluded to when he said it had not been adjudicated, and might be upset. But while illiberal and not yet adjudicated upon, it is a law which I believe was earnestly and conscientiously formulated for the purpose of lifting the standard of dental education in that State. It is not possible for a person in New York to commence the study of dentistry until he can read and write the English language with propriety. If this body will give its moral support to such a condition as will enable the National Board of Dental Examiners to establish a status of dental education, then we shall reach something that is practical. I earnestly hope we will be able to do that.

A motion was made to close the discussion, but Dr. Shepard moved to amend that by suspending the discussion until to-morrow morning.

Dr. Fillebrown was appointed in place of Dr. Walker on the committee to report on the President's Address.

The mayor of Asbury Park very kindly sent the band to the convention hall to play for the meeting.

Adjournment until nine o'clock Wednesday morning.

(To be continued.)

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE regular monthly meeting of the American Academy of Dental Science was held at Young's Hotel, Boston, January 2, 1895, President Smith in the chair. The paper for the evening was read by Dr. James H. Daly, of Boston; subject: "The Thorough Removal of Deposits in the Successful Treatment of Pyorrhœa."

(For Dr. Daly's paper, see page 605.)

DISCUSSION.

Dr. Andrews.—There is one kind of nodule that may be taken for nodular tartar. It is a deposit on the tooth-root very nearly like the deposit we find in forming exostosis, and I question whether it is not directly from the blood. Perhaps I can explain by saying that calcoglobulin in the periosteum in the form of minute globular bodies is given off from the blood-vessels, and these globules are deposited in a gelatinous substance where the globules merge together. Another stage in the calcifying process hardens the mass, and a bony deposit is formed. Now, I believe that some such process takes place in the formation of a certain kind of so-called nodular tartar,—that is, I believe these calco-spherites are deposited from the periosteal tissue on the surface of the tooth at a point near the end of the root, and it is true ossification of tissue,—not really a deposit of tartar, but a formation of bone. I have been studying the subject somewhat, and I have been surprised to see the number of these little nodules, so hard that they resemble the cementum rather than a tartar which you can scale off with an instrument. I must confess that I have as little success in treating this trouble as any I have to deal with. I think I modify the trouble, but it is seldom that I can see a certain cure. I have made a great many mouths very much better; but in the course of time they usually relapse and come for more treatment. To me it is the most puzzling of all the diseases we have to treat, and I am willing to state that I succeed less satisfactorily in this disease than in any other. I acknowledge that I do not understand it, and yet I have read almost everything that has been written upon the subject. I hope we shall get more light and information; something that will enable us to secure more definite results. I hear men make the statement that they cure this disease, but I am sorry to say that I do not have very great success in treating it.

Dr. Daly.—I do not like the idea of taking in everything that comes under the term of “pyorrhœa;” my few thoughts are not on pyorrhœa; one could write a volume about that, and I did not intend, when writing this paper, to include the whole subject. It was written simply with regard to instrumentation as an adjunct in the cure of pyorrhœa. The text-books all say “the deposits should be thoroughly removed.” Well, there is a great deal in that, but the question is, how to thoroughly remove? The student in reading the text-book does not get much information, though sometimes, perhaps, it is as much as the author can give in the allotted

space. I am confident that it is not an easy matter, especially with a large instrument, to remove this calcific matter, whatever it may be, and yet, in my opinion, upon this removal depends your ultimate success in the cure of the disease. I know that this is also Dr. Robinson's belief, and that he treats pyorrhœa with this thought in mind. In a case of alveolar abscess this calcific matter is often deposited at the apex of the root, and the filling of the root-canal does not cure the abscess. The pus continues to flow, (and that's all pyorrhœa is,—simply a flow of pus), and you may use carbolic acid and all sorts of things; but you will not be able to stop the pus until the tartar at the end of the root is removed, and that can only be done by instrumentation, and it takes a very fine, delicate instrument and a delicate touch to do it.

Dr. Andrews.—If a deposit was of the character that I mentioned,—what I believe to be from the calcoglobulin of the blood,—it would be almost impossible to remove it with an instrument. They can be removed, no doubt, but it would be as hard work as to remove cementum. You would be surprised to see some of the specimens I have under the microscope; they look like little elevations of bone on the surface of the root.

President Smith.—It would be interesting to see some of the instruments which members use for the removal of deposits.

Dr. Daly.—Here are just a few, and they are what I prefer. There is a difference of opinion in regard to keeping instruments sharp. Some instructors recommend having them dull,—not dull exactly, but with a bevelled edge; not a sharp cutting edge like this.

Dr. Bradley.—Perhaps the term "right-angle edge" would express the sharpening that Dr. Daly refers to. It seems to me, in the treatment of pyorrhœa, we often do not observe satisfactory methods. For instance, we may have a pocket around one tooth where there is a marked case of pyorrhœa and the pus is exuding. We take off the tartar from that tooth, then go on working around other healthy teeth with the same instruments which we used around the diseased tooth. It is possible to convey the disease to the teeth that are not so badly affected. Therefore, we should be very careful to wash our instruments before using them on the teeth which appear to be the least affected.

Dr. Daly.—Speaking of that, I have in my mind a case now where the right superior central, right lower cuspid and first bicuspid, and left inferior cuspid were the only teeth that were suffering from pyorrhœa in the mouth, and my thought was that one

should be careful in working about the other teeth, as there is a possibility that the disease could be transferred. Else why should it exist in those teeth and not affect the mouth generally?

Dr. G. T. Baker.—I am much pleased with the thoughts of the essayist, and also with the instruments that have been passed around. The only improvement that I would suggest on the instruments is that, instead of being square, they be shaped more like this glass,—that is, made with a curved surface so as to conform to the tooth. As a help to the instrument, I have lately used sulphuric acid, and I find that it dissolves all the small particles and allows them to be removed much more easily. And besides that, it acts as an astringent on the gums, and causes them to adhere to the tooth, and is a benefit in that way. I use the pure sulphuric acid, not the aromatic, making about a three-per-cent. solution, which is about as strong as a person cares to take in the mouth; and I follow it with an alkali, either soda or magnesium, to counteract the effects of the acid. The instruments that Dr. Daly has shown are very good, and one can readily see how well adapted they are to the removal of the deposits about the anterior teeth; but what I want to see is an instrument that reaches down to the apex of the root on the distal surfaces of the molars, and enables us to get at the deposits that now seem quite impossible to reach.

Dr. Belyea.—When I first commenced practice, I had the pleasure of being associated for four months as assistant to Dr. Daly, and naturally I have used many of his methods. It was my custom, he will remember, to use peroxide of hydrogen not only in the ordinary fashion of applying it about the teeth, but also as a mouth-wash. Dr. Daly, being more conservative, perhaps, than I was, made some objections to the use of it as a mouth-wash; but I kept on, and have been using it right along, and have always been thoroughly satisfied with the result. Of course I believe in the ordinary use of the instruments, but I believe I cure more and help more than I otherwise would by the free use of peroxide of hydrogen; and I have seen no bad results from it. I do not believe that listerine does a particle of good, but rather does harm; while the peroxide not only acts as a tonic and a germ-killer, but also dissolves the tartar and makes its removal a great deal easier. I have been using for some time the Oakland Chemical Company's preparation; I like it better than Marchand's.

Dr. Daly.—Dr. Belyea said I was a little more conservative than he was, but it was simply conservatism; I always like to be on the

safe side. You will notice there is sometimes quite a difference of opinion as to what it is safe to use. For instance, Dr. Baker uses a three-per-cent. solution of sulphuric acid, which he says he thinks is as strong as should be used in the mouth; now Dr. James Truman, of Philadelphia, uses a twenty-five-per-cent. solution of the chemically pure sulphuric acid, which is a pretty high solution. As we seem, by common consent, to have extended the discussion to include the entire treatment of pyorrhœa, perhaps it would be interesting to outline Dr. Truman's treatment as described by himself. In the first place, his treatment is to wash out the mouth with a solution of bichloride of mercury, one to two thousand; then, by instrumentation, to remove as thoroughly as possible all deposits; then bathe the roots with a twenty-per-cent. solution of sulphuric acid, and neutralize that by the use of bicarbonate of soda; then he packs sulphate of quinia thoroughly about the roots of the teeth. That treatment is also my treatment, with the one exception that I use aromatic sulphuric acid instead of chemically pure. The solution used by Dr. Truman seems pretty strong, but when you use aromatic sulphuric acid you are using twenty per cent. of the drug itself; it might be called twenty-per-cent. C. P.

Dr. Bradley.—May I ask if the essayist ever uses any agent to prevent pain? My own practice is to bathe the gums, before commencing to use the instruments, with cocaine; this modifies the pain of the operation considerably. I then follow with a preparation of peroxide of hydrogen, three per cent., and bichloride of mercury, one to one thousand, and generally prescribe this as a mouth-wash for the patients to use themselves. I have prescribed listerine, though less ready to do so now than formerly. I have advised the use of it in this manner: Patients, after brushing their teeth thoroughly, are to rinse out the brush and go over the teeth again. I do it to get the effect of the listerine and to enforce a more thorough cleansing of the teeth. There is one objection to the use of bichloride of mercury and peroxide of hydrogen as a mouth-wash: if it be continued long by the patients it will stain the teeth; this effect may be guarded against by the patient, as the stain can be removed without much difficulty by the application of a powder.

Dr. Briggs.—This is a very interesting subject, and it is hard to approach it without going into the whole field of pyorrhœa alveolaris, its cause, prevention, treatment, and cure. I think Dr. Daly has struck the key-note when he refers to the importance of thor-

ough use of instruments in the treatment of this disease. When I first entered into practice, the only attempt at treatment was to scale the teeth in the ordinary manner; and my first instinct was to wander into the fields of medicine and apply something which would help to restore the gums to a healthy condition, thinking to arrest the disease in that way. Now, while I still continue to apply the medicines, I believe the foundation of the treatment is to remove the tartar with the instruments; and I do not believe—at least I have not seen it in any case in my experience, which has covered about seventeen years—that we have this disease without deposits of calcareous matter; and the cases that have been reported of pus exuding from the gums where this deposit was not present, I am not inclined to accept, because I think the observers did not explore carefully and delicately enough to find the deposit. I believe if we see the case before the disease has progressed too far that we can make cures; if it is allowed to exist too long, it extends to the apex of the root and destroys the alveolar process, and there is no hope of saving the tooth. I have found, as Dr. Andrews has described, some deposits that simulate exostosis, and I would like to cite a case. About six weeks ago I saw a patient whom I had been treating for this trouble, and a year ago I thought I had the case under pretty good control. The patient went abroad and returned a couple of months ago and came to me with the tooth in a bad condition. I treated it to the best of my ability, but apparently without doing a particle of good, and I finally took it out. At the apex of the root, beyond where my instrument could go, I found a hard, smooth deposit. I removed this, and the tooth being in good condition, I drilled the socket a little deeper—say one sixteenth of an inch—and put the tooth back, holding it with a splint. Last Saturday the splint was removed, and I am in hopes that I will succeed in getting further service from this tooth. This deposit was entirely beyond the reach of any instrument; still I do not believe that it came there except through an original avenue, or socket or pocket, which began at the margin of the gum; and if one can get at these pockets soon enough, before they have extended very far up the root, there is no reason why one should ever lose a tooth from this disease. I might say that I use in my practice, in connection with the instruments, trichloroacetic acid, and I find it helps to remove the calcareous matter; and as for the instruments, I do not think the inventive mind of the dentist can be employed too fast or too assiduously in devising these points. We have reached the limit of the instruments which we now have, and are

not able to obtain the results which we desire with them. Some of you are much more inventive than others, and there is at present nothing in the whole field of dentistry where ingenuity can be employed to better advantage than in the improvement of our instruments, that we may be enabled to reach the parts which it is necessary that we should, but which are at present without the limits of our instruments. I would like briefly to go over the treatment that I am at present using. First, wipe the gums with a twenty-per-cent. solution of cocaine, to numb them as far as possible; then cleanse the mouth with pyrozone; then, while I am getting my instruments ready, I instruct the patient to keep rinsing the mouth with the solution made by dissolving one of Seiler's tablets in a glass of water; I then wipe around carefully in the pockets with trichloroacetic acid, which I have found to be the best thing I have ever used for the softening of the tartar and the dissolution of those little fragments that cling to the root after you have removed the larger portions; after this I proceed with the instruments, and I consider this the most important part of the whole treatment. I have sealed teeth until I would be sure that they were absolutely clean, and then look at them in a week and would find a number of those little dark spots, which would necessitate going over the whole field again. It is easy to be deceived in this work; for, as Dr. Andrews says, some of these spots are so smooth and hard that the instrument glides over them, and you would be sure that you had removed all the calcareous matter on the root; but as long as any little spot remains you will continue to have your pocket, and the case will never be cured. Careful work, then, with the instrument is the most important thing. After that is thoroughly done—mark you, there are many cases where, with our present instruments, it is impossible for us to remove all the deposits, and such are for the present beyond our relief—you will have no difficulty in saying that you have seen cases that have been cured. After you have removed the tartar, then, of course, comes the treatment of the pocket; and it suggests itself to you to make that aseptic; to remove all the dead tissue, which I burn off with caustic potash, and then close up the pocket by applying an astringent; and the astringent that I use is the chloride of aluminum. Of course, you can use any other astringent that you are accustomed to; but I have had such uniform success with chloride of aluminum that I am glad to recommend it. There was one other point that Dr. Banfield particularly spoke of,—that of dead pulps. There are a great many cases where the disease

has gone up the root some distance,—not apparently very seriously; and yet, it has been my experience, you will find that it has affected the pulp of the tooth, and you have a complication of a dead tooth with the other mischief; and you may go on, treating the pyorrhœa indefinitely, without affecting a cure, simply because the dead pulp needs to be taken out. Other cases come to your notice before the pulp dies; and if you find with a bad case of pyorrhœa that there is any indication of pulpitis, it seems to me much better to take the “bull by the horns” and remove the pulp, which simplifies the treatment very much.

President Smith.—I would like to ask Dr. Briggs, in connection with this treatment, whether he now uses (I think I am right in assuming that he formerly used) sponge-grafting for the pockets—packing in sterilized sponges for the tissues to grow about?

Dr. Briggs.—I still use the sterilized sponge a great deal; I would not be without it in my practice. It is not so applicable in these cases as I would like, because one side of the pocket is bone, and it is very hard, in that condition, to get the proper grafting into the sponge; and I find if you have a bad pocket, the best thing you can hope for is to cure and then endeavor to make the gum adhere to the tooth as best you can; you are sure to have a certain percentage of retraction of the gum about the teeth, any way. If the gum is healthy, you can, by the use of astringents, usually get a satisfactory result. If I may be allowed to digress a little, I would like to refer to the value of sponge-grafting for other things. I wish you all would use it for curing old fistule and as a sponge-tent for opening into an abscess; for instance, if you have opened into an abscess or down to the apex of a root that is troublesome, and succeeded in finding the cavity or track of inflammation and pus, after cleaning it out as best you can, pack in sterilized sponge, which acts as a perfect drainage-tube for any further formation of pus and prevents other material from getting in there; and when the tissues begin to heal the sponge becomes absorbed, as you know, like a piece of catgut. In a great many places where the inflammation has left cavernous spaces about the roots of the tooth, I pack the sponge in there, and it can be left for some time without becoming at all offensive.

President Smith.—The reason I spoke about it was because I had tried it in one or two cases and was not so successful as I had hoped to be. There is one thing that I have not done in the past as much as I shall do in the future,—that is, after removing the deposits about the roots of the first and second molars, where the disease is ad-

vanced, you find these great, deep pockets where everything lodges. I am in the habit now of giving to my patients a solution of carbolic acid together with a syringe, with instructions to keep the pockets thoroughly clean. These pockets serve as a catch-all for the foods and secretions and greatly retards the return of the tissue to normal use; when this precautionary measure is used, the improvement is more noticeable.

Dr. Briggs.—I would like to speak of one more thing, which I think will be found to be very useful in our treatment of pyorrhœa in the future. In our improvements in local anæsthesia there are great strides being made, as you have noticed, in finding out what drugs can be used with absolute safety; and there is a most interesting paper in the last number of the Journal of the American Medical Association describing Schleich's method and giving the formula of an absolutely safe preparation to be used as a local anæsthetic. If this method is completely successful, I believe that we will be able to open the gums a little around the tooth, and then, packing in the sponge, force up the gum to the tooth. I have no doubt that many cases can be closed in that manner.

WILLIAM H. POTTER, D.M.D.,

Editor American Academy Dental Science.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE Thirteenth Annual Session of the National Association of Dental Examiners was held at Asbury Park, New Jersey, commencing Monday, August 5, 1895; the President, Dr. L. Ashley Faught, of Philadelphia, in the chair.

The following State Boards were represented at the sessions:

Alabama.—T. P. Whitby.

Delaware.—C. R. Jefferis, D. M. Hitch.

Georgia.—J. H. Coyle.

Iowa.—J. T. Abbott.

Kentucky.—H. B. Tileston.

Kansas.—J. O. Houx.

Colorado.—R. B. Weiser.

New Jersey.—F. C. Barlow, Chas. A. Meeker, Geo. E. Adams, E. M. Beesley.

Pennsylvania.—Louis Jack, W. E. Magill, L. Ashley Faught, Jesse C. Green.

Tennessee.—F. A. Shotwell.

Virginia.—J. Hall Moore.

District of Columbia.—H. B. Noble, Williams Donnally.

The following boards were elected to membership :

Connecticut.—George L. Parmele.

New York.—William Carr.

New Hampshire.—Edward B. Davis.

A resolution, offered by Dr. Barlow, requiring credentials to the Association to bear the official seal of the State Board making the application, was adopted.

A resolution, offered by Dr. Donnally last year, and laid over, permitting persons who have been delegates to the Association to be associate members without the right to vote or hold office, was taken up and adopted.

Dr. Jack offered the following, which was adopted :

Resolved, That this body would express to the Association of Faculties the importance of an examination of the equipment, methods, and facilities of instruction of all the dental colleges of this country; it being understood that such examination is to be purely in the interest of higher educational standards and towards an approach to ultimate uniformity in the curriculum and methods of the schools, and more particularly to enable safe action to be made with respect to new schools.

Later a communication was received from the secretary of the National Association of Dental Faculties to the effect that the Association had ordered the secretary to secure information from the various colleges regarding their equipment and general facilities for teaching; that this information would be systematized so as to be available at the next annual meeting of this body.

The following "plan of requirements for the recognition of dental schools," offered by Dr. Jack, was adopted, with a proviso that it shall apply only to colleges making application after the close of this session :

That each dental school which may in future come before this board for recognition must have a teaching Faculty composed as follows, to wit: at least three professors of dental subjects,—namely, for operative dentistry, for dental prosthetics, for dental pathology and therapeutics. For the medical subjects there must be at least five professors,—namely, for anatomy, for physiology, for chemistry, for pathology, and for materia medica.

Its students must also be taught the subjects of chemistry and bacteriology in laboratories adapted to the purpose and under suitable instructors.

That such special school must possess, in addition to suitable lecture-rooms, a well-appointed dental infirmary and a general prosthetic laboratory; also each school must be provided with a room or rooms suitable for manual train-

ing in operative dentistry, and must furnish in this way systematic instruction to its students.

All of these provisions are to be determined by careful inspection on the part of the Board of Examiners of the State within which is located the school, or other authorized body duly endorsed by this Association. And upon the result of this examination may depend the question of reputableness.

The following colleges were added to the list of recognized schools: Dental Department of the University of Denver, Denver, Colorado; Department of Dentistry of Detroit College of Medicine, Detroit, Michigan; Dental Department of Western Reserve University, Cleveland, Ohio.

Applications from the following were laid over one year: University of Buffalo, Dental Department; Atlanta Dental College; University College of Medicine, Dental Department, Richmond, Virginia; Birmingham Dental College; Cincinnati College of Dental Surgery.

The Committee on Colleges, in its report, which was presented by its chairman, Dr. Jack, expresses the view that more should be required to establish the right of dental schools to recognition by this body than good organization and the fulfilment of the rules of the Association of Faculties. Evidence should be furnished that the teachers are of high standing; that they require of their matriculates the stipulated preliminary training, and that they are carefully qualifying their students in every necessary direction. To ascertain these facts is a matter of difficulty. It is necessary, too, in addition to an ascertainment of the character of the faculties of any school, to discover the degree of confidence which has been developed in the minds of the local members of the profession.

The number of students in actual attendance in all the schools of the country for the session 1894-95, excluding those attending special courses, was 4978, as against 3997 at the previous session; graduates 1208, as against 911.

The committee also expressed the conviction that it is becoming evident that the dental schools are increasing in number beyond the needs of the public, owing to the tendency of medical schools to inaugurate dental departments. The installation of dental departments in connection with medical schools is necessarily often incomplete, and therefore the committee believes that restrictions should be placed upon the rapid increase of inefficient dental colleges. As the practice of dentistry is largely based upon knowledge of chemistry and bacteriology, and as manual training has become an integral part of the curriculum of some of the better schools, we rec-

commend that the Association do not in future recognize any school unless satisfactory evidence is furnished that the students of such schools applying for recognition are being taught in modern chemical and bacteriological laboratories, and are also furnished with every convenience for manual training in prosthetic and operative dentistry, and that this latter mode of practical instruction is systematically carried on in at least the first year's course.

The committee also called attention to the importance of a higher standard of preliminary education, and to the impropriety of schools advertising as instructors practitioners who occasionally clinic before the students, but are not a part of the staff of the institution.

The report was adopted.

The following resolution, offered by Dr. Magill, was unanimously adopted:

Resolved, That we will not in future consider favorably an application for recognition from any college which has as a member of its Faculty one who also holds membership in the State Examining Board.

Dr. Donnally moved that final action shall not be taken on the application of any college until such application has been in the hands of the chairman of the Committee on Colleges for at least ten months.

So ordered.

The following were elected officers for the ensuing year: J. T. Abbott, Manchester, Iowa, President; H. B. Noble, Washington, D. C., Vice-President; Charles A. Meeker, Newark, N. J., Secretary and Treasurer.

Adjourned.

Editorial.

THE RECENT CONVENTIONS.

A SUFFICIENT time has elapsed to form an unprejudiced opinion in regard to the work of the several national organizations that met this year at Asbury Park, New Jersey. These meetings would be valueless did they not open up to a more enlarged conception of professional duty and to a broader foundation in professional knowledge.

That this much is accomplished in all large gatherings must be conceded, and this constitutes the best reason for their continuance.

While this is true it by no means follows that this widening of scope has been extensive, or that the horizon, in a scientific direction, has been greatly enlarged; indeed, were we to express in a few words the outcome of these gatherings, we should say that, beyond the minimum effect, there had been nothing gained by the assembling of delegates from all parts of the country. This remark applies with peculiar force to the meeting of the American Dental Association.

It is well understood that criticism of large bodies is never received kindly, for the excellent reason that whatever may be their short-comings the managers are rarely or never to blame. It is unreasonable to expect a national gathering to rise higher than its source of supply, and the dental profession, in its entirety, is not equal to the formation of a body thoroughly capable of grasping problems with scientific accuracy. Hence there may be something of harshness when it is stated that, in the opinion of the writer, the meeting of the American Dental Association of this year was no better than many that have preceded it; in fact, was not up to the standard of a well-organized local association. This would seem to point to the probability that national associations have had their day, and that the real work of the profession will, in the future, be accomplished by local organizations.

That this is true is manifested by the continual infliction of papers of but little general interest and of doubtful practical application. Those who were present at the recent meeting will recall the time taken up by the reading of three papers on nomenclature when one would have been ample. The subject is one of some interest in an educational sense, but, as has been repeatedly stated in these pages, language cannot be changed by essays, however learned they may be.

So much time was absorbed in the reading of these and others similarly duplicated that many of the sections were practically ignored and the papers read by title. This practice is unjust to the writers and a possible loss to those in attendance. The fault lies in the absence of a properly organized head to this body. The Executive Committee has no opportunity to learn, as far as we are aware, how many papers are to be presented or what will be their character. This is left, principally, to the chairmen of the various sections, who make their reports according to the order of business. The result is a lack of systematic arrangement, which

gives a mass of material impossible to present or to discuss. It is probable that those present may not have suffered any loss by title reading, but it is certainly not a dignified way of conducting meetings, nor does it add any to the interest.

The question has been repeatedly asked, why the attendance was not greater? The proximity to four of our large cities, in which some of the most active minds in dentistry reside, seemed to warrant the expectation of a very large meeting, and yet the number, while large, was not much greater than at less favorably situated resorts. This paucity of numbers can only be accounted for upon the basis of a lack of interest. The proceedings, as published from year to year, have not aroused sufficient enthusiasm to induce unusual efforts or sacrifices. This is unfortunate, for, if nothing else be gained, the social intermingling is above price, leading to a greater infusion of energy in the upbuilding of the profession. Nothing so certainly leads to retrogression as isolation. Commingling means friction and friction means growth and increased strength.

Great improvements are necessary in this Association if it is to remain worthy the attention of the scientific thought in dentistry. It will not be much of a gain to adopt the plan as proposed by the Executive Committee that the sections meet daily. These branches of the main body, as at present organized, are of but very little use, except as a channel by which the main body can be fed. If, however, it is meant by this proposition to make sectional meetings for the discussion of papers, then we beg leave to enter a serious protest. This plan was tried at Chicago to the general disgust of all those in attendance, and should never be repeated. What is required is a central power with the moral courage to eliminate matter not wanted. Reduce the number of papers. Insist on synopses being furnished and printed prior to the meeting, and give time for the expression of opinions for or against the ideas advanced. Give preference always to original work, and let such papers be read at the beginning of the meeting and not left to the last when there is scant time either to hear or discuss. If the iron hand of revision could be laid upon the productions in advance of reading, it would help to a clearer understanding of the subject-matter.

It seemed a fateful combination of circumstances that the American Dental Association should be, at this meeting, entirely surrounded by trade. It has been the feeling of many good men that unless this trade interest was eliminated dentistry would never rise to the dignity of a profession, and here we had its influence exhibited to an unbearable degree. The auditorium, where the meeting was

held, was unusually large, thus enabling the local committee to give ample space for an exposition of goods of varied character from an inkstand to a dental engine. It was certainly a remarkable exhibit, and the visitors at Asbury Park were not slow in discovering it. The meeting proper was held inside of this *fringe* of trade, which almost completely surrounded and dominated it. The noise of the visiting multitude made attention to the work of the convention a serious labor, and produced much dissatisfaction. It is to be hoped that the Executive Committee will see to it that this unpleasant combination is avoided in the future. We regarded the selection of this hall a mistake from the first, being too large for a comfortable meeting. Educational Hall would have been preferable in every respect, and the trade interests, valuable as they always are, could have been exhibited in an adjoining and very convenient building.

The work of the associations meeting at the same place, such as the National Association of Faculties, National Association of Examiners, School of Dental Technics, and Dental Protective Association, will be reported in regular order.

The "Faculties" made but little advance in the standard of dental education. It was anticipated that the course would be extended to seven months, but, for reasons best known to the majority, this was not adopted, and a compromise on a six months' course was finally decided as the best attainable at the present time.

We have no desire to give undue expression to a conviction that this organization has need of more wisdom than was manifest at the recent annual meeting. An element seems to have entered its counsels which, if not eliminated, will most assuredly end in its disruption. This, should it occur, would be a calamity, for in union only will be found strength.

The Dental Protective Association held an enthusiastic meeting and one that should be productive of far-reaching results. It is doubtful whether the majority of those present were ever before as fully informed of the working of this organization or so generally impressed with the unselfish work of Dr. Crouse, its founder and manager. It was the general impression that if this information were made general the profession would take a deeper interest. It is, unfortunately, true that the majority of dentists have entertained prejudices against the management, regarding it as altogether too personal. This has been exceedingly unfortunate, and has acted as a serious bar to the progress of the Association, and it is hoped that the publishing of the proceedings of this meeting will go far to dis-

abuse the minds of many of the erroneous idea alluded to and lead to a more active co-operation.

The School of Dental Technics had a full meeting, and considerable interest was manifested in its work. This, to our conception, is not sufficiently extended to warrant a separate organization. It might, with very great propriety, be merged into the Association of Faculties, for that body will be forced, in the near future, to take up the consideration of methods of teaching, it having very nearly completed the preliminary work it set itself to accomplish.

The spirit of antagonism to dental colleges, which yearly makes itself felt in all our conventions, was especially obnoxious at the American Dental Association. We cannot believe that the sentiments expressed are shared by the majority, for, if this were true, dental colleges will have had their day. The presiding officer should prohibit the use of the floor upon these occasions for the expression of malignant spite and libellous accusations. It is to be hoped we have seen the last of these humiliating exhibitions.

The criticism made against Asbury Park as a place of meeting applies with equal force to all summer resorts. It is to be regretted that the Association selected Saratoga Springs for the next meeting, for this place is in no degree better, for the members are forced to scatter all over the town, destroying the possibility of social intercourse, the lack of which was the most objectionable feature in the recent meeting. The true locality for these associations is Niagara Falls, and it is to be hoped that the Saratoga convention will settle upon this favored place for the succeeding five years, and thus avoid the yearly migration to unsatisfactory locations.

It was a matter of profound regret that the honored president of the American Dental Association, Dr. J. Y. Crawford, should have been stricken down with a severe illness at the close of the first day. He had the sympathy of the entire meeting, which was manifest by re-electing him president for the ensuing year. His sickness, while severe and prolonged, ended happily in his recovery. The duties of the presiding officer were most satisfactorily performed by the vice-presidents, Dr. S. C. G. Watkins, of New Jersey, and Dr. Thomas Fillebrown, of Massachusetts.

The work of preparing for this meeting was voluntarily assumed by the New Jersey State Dental Society, and, while some things might have been omitted to advantage, nothing but praise is due for the great labor and intelligent efforts expended to make the meeting a success.

It is to be regretted that so many fail to meet at these gather-

ings. If nothing else be gained, there ensues a co-operation of interests in the active commingling, and this is an immeasurable benefit to the individual and to the society. The influence of every one is needed that dentistry may progress, and no one has a moral right to withhold it. Let, therefore, Saratoga be the Mecca of all thoughts for the coming year, and gather by its sparkling waters, and there renew strength and add to the vitality of the profession to which we all owe allegiance.

THE "FACULTIES" AND HONORARY DEGREES.

THE history of honorary degrees has never yet been written, but if ever prepared it should show one of the most interesting phases of poor, weak human nature. The average credulous mind invariably takes it for granted that when the announcement is made that Mr. — has had the degree of M.D., D.D.S., A.M., or LL.D. conferred without curriculum that it is an evidence that Faculties have been impressed with the great skill or learning of the individual and have conferred the honor in kindly recognition of the fact. That this is rarely true is well understood. Influences are brought to bear to an extent not generally appreciated. So much is this the case that those familiar with the subject have long since ceased to feel otherwise than a measure of contempt for such honors no matter from whence derived.

The Association of Faculties early set its face sternly against any such degree, and supposed it had thoroughly barred the way beyond which there could be no trespassing. At the recent meeting at Asbury Park the effort was made to have it conferred, and it came very near being successful. We are disposed to believe that the majority vote permitting such action was the result of thoughtlessness in some of the delegates present, which upon subsequent consideration led to a reconsideration of the vote and rejection of the application.

The possibility of this attempt being eventually successful should lead this Association to pass a law, at its next session, making it absolutely impossible for any of the separate colleges, departments of universities, or the universities themselves to grant the degree of Doctor of Dental Surgery or its equivalent. The attempt to influence this Association and other recent occurrences should be warnings to be heeded. The dental profession of America cannot

afford to peril its reputation by countenancing in any way this degree.

The course of some of the members of the Association of Faculties in this matter is not comprehensible in the light of their public utterances, but this is only another evidence that some men seem to prefer retrograde movements rather than a perpetual advance towards a more perfect standard.

It is very satisfactory to note that the American Dental Association placed itself positively on record upon this subject, and we believe this expression will prevent all future efforts in this direction.

ERRATUM.

On page 565 of the September number, eighth line from bottom, "one drachm of water" should read "one ounce."

Bibliography.

GENERAL SURGERY AND PATHOLOGY FOR DENTISTS. By Edmund W. Roughton, B.S., M.D. (London), F.R.C.S. (England), Warden of the College of St. Mary's Hospital; Assistant Surgeon and Surgeon-in-charge of the Throat and Ear Department, Royal Free Hospital; Honorary Visiting Surgeon National Dental Hospital, etc. With numerous illustrations. Published by J. B. Legg & Co., 289 and 291 Regent St., London, England; S. S. White Dental Manufacturing Company, Philadelphia.

This book of one hundred and thirty-four pages is intended "to supply the student of dentistry with an account of general surgery and pathology sufficiently comprehensive to enable him to practise his profession intelligently, yet concise enough to be easily mastered." While this statement, quoted from the preface, is correct, this book differs from many others prepared to make acquisition of knowledge easy for the student, in that it gives very clear descriptions of pathological subjects and leaves little to be desired in the way of definition.

The book opens, very properly in our judgment, with the subject of inflammation. This is treated very clearly and quite satisfac-

torily as to detail, giving the generally accepted ideas of the phenomena accompanying it. This is followed by "Bacteria in Relation to Disease, Wounds, Surgical Fever, Shock, Delirium, Hemorrhage, Fracture, Syphilis," etc., giving a general survey of important matters necessary for the student to acquire in order to have an intelligent conception of general pathology in its intimate relations with the special, with which he is brought daily in contact.

The book is a timely one, being much needed by teachers of this branch to place in the hands of students and thus avoid the large works which are, as a rule, confusing by over-description. If this book should reach a second edition, we would suggest collaboration with a competent dentist, that special matters might be elaborated to the advantage of the student and increase the value of the book without materially enlarging it. The author proposes to meet this want, "The Special Surgery of the Mouth," in another volume. This, to our conception, would be a serious mistake, greatly destroying its value as a text-book.

Obituary.

DR. EDWIN C. BAXTER.

DIED July 14, 1895, at Albany, New York, of typhoid fever, Dr. Edwin C. Baxter.

The announcement of the departure of young and old is always accompanied with a feeling of sadness that sooner or later all must pass over into the silent land whether their lives have been useful or otherwise.

The dental profession has suffered serious loss the past few years in the deaths of many of its brightest men, and among these can certainly be classed the friend of many years, Dr. Baxter, of Albany. His ability in his profession was never questioned; as an operator he had few, if any, superiors. The basis of his professional excellence was laid when mechanical and operative dentistry were considered of primal importance. To this practical education was superadded his collegiate work in the Pennsylvania College of Dental Surgery of Philadelphia, from which he graduated in 1866, leaving nothing in his training to be desired.

His natural bent seemed to the writer to be away from the

stirring activities of professional life, hence he was rarely met with outside of his own State in conventions; but in it he was regarded with the respect due to a man of eminent worth and solid judgment. He was one of the examining board of New York State, and had much to do with the passage of the recently enacted law placing dentistry under the State Board of Regents.

The family of the Baxters were originally from Maine, of English descent.

He began the study of dentistry with Dr. Edwin Parsons, of Portland, Maine. From there he went to Philadelphia and graduated, subsequently becoming the assistant and, at a later period, the partner of Professor C. N. Peirce. He settled in Albany about twenty-five years ago.

Dr. Baxter was married in 1873 to Lydia Ryerson Sprague, of Long Island, who survives him.

Thus passed from life one of the warmest friends and the gentlest of men; but his life, kind deeds to those who needed help, and his faithful work will be a lasting memory to those who knew him best.

SIR JOHN TOMES.

THE death of this distinguished man has created a deep impression throughout the world of scientific thought. It can be said with truth that no man connected with dentistry has so marked his individuality upon it as the subject of this sketch, and, perhaps, no one has done more to place the dental profession on a solid scientific foundation.

He was born at Weston-on-Avon in 1815, and studied at Kings College and the Middlesex Hospitals. He commenced practice in 1840.

His first work was published in 1848, entitled "Dental Physiology and Surgery." He says, in the preface of this, "When I had the honor to accept the office of dentist to the Middlesex Hospital, I promised the medical officers that . . . I would deliver a course of lectures on dental physiology and surgery. . . . The first six lectures are devoted to dental physiology, and they contain, I think, some new views on the development of dentine and enamel. . . . These lectures were written for and delivered to beginners, . . . and were not written for those who have learned, but for those who have yet to learn."

The modesty of this concluding paragraph, while characteristic, was unnecessary then as it has been in succeeding years, for these have but deepened the conviction that this work of Sir John Tomes is one of the most valuable ever published upon dental subjects. Future investigators have added but little to his discovery of the dental fibril, which came at a later period, being announced in *Philosophical Transactions*, vol. cxlvi., and subsequently reproduced in his "Dental Surgery," issued in 1859. This latter book is still used as a text-book; in fact, nothing that Sir John has written but has a distinct value, not in the least diminished by years.

He led the way in the investigation of the minute anatomy of tooth-structure, and shed such a flood of light upon the histology of the tissues connected therewith that the first period of investigations in this direction may be said to have practically ended with his labors.

He aided materially in the improvement of extracting-forceps, basing their formation on true anatomical considerations.

His name, however, will go down into professional history for his scientific work, which was continued to a late period of his active life.

He was an energetic participant in the long fight in England to advance the dental profession in a legal and educational sense. He was prominent in the parliamentary warfare that led to the Act of 1878, which made training, diplomas, and registration compulsory.

He retired from practice some years since, and has resided at Caterham.

He was knighted in 1886, in recognition of "eminent services rendered his profession."

His death will be sincerely mourned on this side of the Atlantic; but while all must feel that the world has lost one of its ablest workers, there remains still the compensating thought that he lived to see the seeds which he planted in his early professional life, bearing rich fruitage for the advancement of his chosen profession throughout the world.

Notes and Comments.¹

SELF-DENIAL.—The key to success in any department of life is self denial. Idleness, laziness, wastefulness, come from lack of it; while industry, promptitude, economy, thrift, and a successful career are the result of it.—NEAL DOW.

BAD LUCK.—I never knew an early-rising, hard-working, prudent man, careful of his earnings, and strictly honest, who complained of bad luck. A good character, good habits, and iron industry are impregnable to the assaults of all the ill-luck that fools ever dreamed of.—ADDISON.

DEVITALIZATION OF HIGHLY INFLAMED PULP.—Professor Truman says, I have most satisfactory results from the use of iodoform in small quantities in connection with arsenic. So far as tried, there has not been a particle of pain in acute pulpitis.

MOSQUITO BITES.—A correspondent writes to the *New York Tribune* that an effectual and speedy cure for mosquito bites is aristol. The tip of the finger is moistened with water and a little of the powder taken and rubbed on the inflamed spot.

TO MEND BROKEN PLASTER CASTS.—Paint the broken surfaces over two or three times with very thick shellac varnish, and at each application burn out the alcohol over a flame. When the shellac is sufficiently soft, press the parts together, and hold in position till cool. It will be as strong as it was before broken.

AFTER-PAINS FROM EXTRACTION OF EXOSTOSED TEETH.—When the bone has been distended and strained actual osteitis may result.

¹ The assistant editor solicits contributions for this department,—new methods, new remedies and formulas, or any short practical note which may prove of value to the practitioner or student. Address 1718 Walnut Street, Philadelphia.

with severe pain and inflammation. Dr. J. D. Thomas, the well-known specialist, says that the application of hot water will act like magic, relieving the congestion and diffusing the induration, establishing normal circulation through the parts.

ROOT-CANAL FILLING.—For doubtful root-canals Dr. Ottolengui prepares a gutta-percha cone by dipping waxed floss silk in chloro-percha and laying aside for chloroform to evaporate. Then fills canal with chloro-percha and carries silk gutta-percha cone to place, leaving projecting end in cavity. This is easily removed if trouble ensues.

RESTORATION OF HARDENED RUBBER.—It is said that rubber goods which have become hardened by age may be restored to almost original softness by simply soaking in a water of ammonia diluted with twice its bulk of fresh water; and that this does not injure the rubber in any way, and restores the elasticity. Usually soaking for ten minutes to half an hour is quite sufficient. After drying, the whiteness may be restored by dusting well with chalk or kaolin.—*Dental Office and Laboratory.*

METHOD OF MOUNTING DISKS AND POINTS FOR DENTAL ENGINE.—Dr. T. F. Chupein claims that the best way to mount disks and points for the dental engine is with phosphate of zinc cement. Mix this to a creamy consistence. Drop a small quantity in the hole of the disk or point, and rub a little on the end of the mandrel. Place the mandrel point in the hole of the disk, and make it true by putting the shank of the mandrel through the disk setter. Let this remain till the cement gets perfectly hard, and you will find that the disk or point will never separate, which cannot be said of mounting these with gum shellac, as is generally done.

RUBBER DAM FOR PULP-CAPPING.—To the various well-known capping or non-conductive methods of procedure in pulp protection Dr. W. Storer How advises the interposition of a disk or rubber dam. The material is always at hand, and by folding a piece in sextant shape and with the scissors snipping off the point, an impromptu disk may be made to suit the cases. For example, cut two such disks. Having the cavity formed and dried for filling,

the cavity floor and walls are to be lightly touched with a very little ball of cotton carrying about a drop of pure mastic varnish or other cavity lining. Then touching the cotton ball with the end of a curved canal broach, pick up the disk and delicately cover the cavity floor, to which the disk will stick; mix some cement, suitably soft; put a little on the centre of the second disk, lift it with a pair of fine-pointed foil tweezers and gently place its cement side against the other disk, and with a ball burnisher softly spread the cement under the second disk to completely cover the cavity floor and partly cover the cavity walls. Allowing some minutes for the setting of the cement, the remaining area of the cavity can be filled with whatever material may be preferred.

Current News.

UNION DENTAL MEETING.

A UNION meeting of the Connecticut Valley Dental Society and the New England Dental Society will be held at Worcester, Mass., October 23, 24, and 25. Many interesting papers and clinics are promised, and an elaborate programme is assured. An important question—Shall these two Societies consolidate, forming a new society, to be called the "Northeastern Dental Association"?—will be decided at this meeting.

GEO. A. MAXFIELD, D.D.S.,

Secretary Connecticut Valley Dental Society.

E. O. KINSMAN, D.D.S.,

Secretary New England Dental Society.

DENTAL ASSOCIATION OF NEW SOUTH WALES.

THE Third Annual Meeting was held at the Australia Hotel on Friday, and was well attended. The president, Dr. Burne, occupied the chair, and stated, on behalf of the council, that great hopes were entertained of the Dental Bill being brought before Parliament and becoming law during the ensuing year. The balance-sheet showed

a credit balance of seventy-three pounds in hand. It met with general approval. The following officers were elected for the year 1895-96: President, Dr. Burne; Vice-Presidents, Messrs. H. Paterson and S. Chaim; Honorable Treasurer, Dr. W. T. Halstead; Honorable Secretary, Mr. H. Taylor; Committee, Dr. Arthur Hinder, Messrs. C. C. Marshall, F. G. Hollway, J. Darton, H. S. Newton, E. A. Gabriel, and Byron Ruse; Auditors, Messrs. Corbett and Hebblewhite. A vote of thanks was unanimously accorded to the president, who, in thanking the members for their support, referred to the necessity of the profession drawing closer together, and thus securing a higher status. A vote of thanks to the honorable secretary for past services and also to the chairman closed the meeting.

H. TAYLOR,
Honorable Secretary.

SOUTHERN DENTAL ASSOCIATION.

THE next annual meeting of the Southern Dental Association will be held in Atlanta, Georgia, commencing the first Tuesday in November. Arrangements are being made for the greatest meeting in the history of the "Southern." The cotton States and International Exposition will be in progress, and railroad rates will be very low. All friends will be given a hearty welcome.

Respectfully,

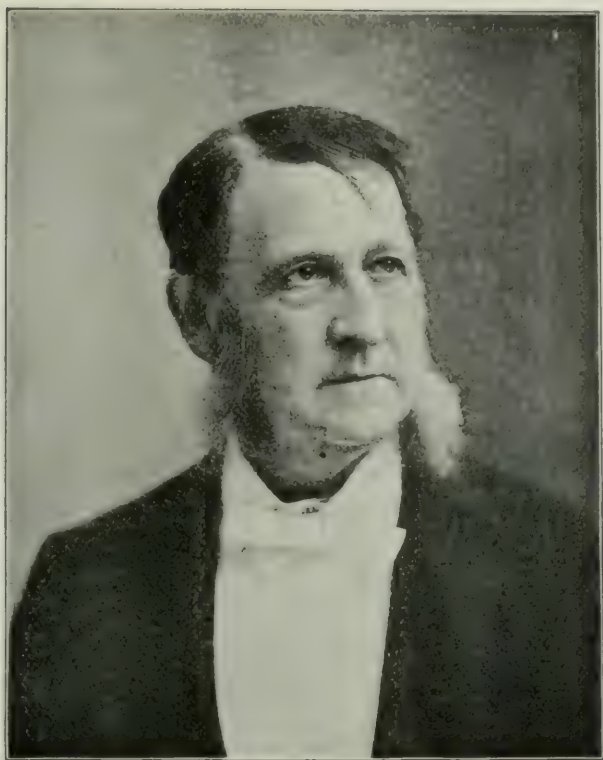
E. P. BEADLES,
Corresponding Secretary.

AMERICAN DENTAL SOCIETY OF EUROPE.

THE meeting of the American Dental Society of Europe held at Boulogne sur-Mer, France, under the presidency of Dr. Charles W. Jenkins, of Zurich, was one of the most successful and interesting meetings for several years. The next session will be held in Dresden, Germany, in 1896, immediately preceding the meeting of the International Medical Congress in Moscow, thus allowing of attendance upon the two sessions without loss of time.

The officers elected for the ensuing year are as follows:

John H. Spalding, of Paris, President; Charles J. Monk, of Wiesbaden, Vice-President; William A. Spring, of Dresden, Secretary; Samuel S. Macfarlane, of Frankfort, Treasurer.



Dr. James E. Garretson.

DR. JAMES E. GARRETSON, Dean of the Philadelphia College of Dental Surgery, died of enteritis, at his home, Lansdowne, near Philadelphia, Sunday, October 27, 1895.

The death of this distinguished surgeon and writer comes with a shock to his many friends, and will bring a feeling of sorrow to a large circle in the

medical and dental professions, in both of which he was equally prominent.

Dr. Garretson was born in Wilmington, Del., in October, 1828. He began the study of dentistry when quite young, and practised for a time in the neighborhood of Woodbury, N. J. He graduated in 1856 at the original Philadelphia College of Dental Surgery, the predecessor of the present Pennsylvania College of Dental Surgery. Shortly after graduation at this school he entered the University of Pennsylvania, and graduated as Doctor of Medicine after the usual course. He practised dentistry for some time subsequent to this, but his taste ran more to medicine and surgery, and he joined Dr. D. Hayes Agnew in his work at the Philadelphia School of Anatomy. It was this connection and his special studies that led him directly into a surgical practice which continued, with little interruption, for the remainder of his life.

It was through his efforts that a special branch of surgery was organized and became recognized as "oral surgery." He was subjected to some criticism at the time, as it was deemed by some to be an unnecessary division. This had its origin in a positive prejudice, at this period, against specialties in medicine. The question was frequently asked, "In what does oral surgery differ from general surgery?" Whether Dr. Garretson ever answered this query is not known to the writer, but he so impressed his individuality upon his work that oral surgery became a special branch of teaching, and has now been adopted as part of the cur-

riculum of most of the leading dental colleges of the United States.

The history of his surgical work has yet to be written, but whoever prepares it will do injustice to Dr. Garretson if he fails to describe his kindness, tenderness, and ever-abiding sympathy with suffering, as well as the courage that enabled him to perform the most terrible operations with a skill not exceeded anywhere.

He was the first of the surgeons, we believe, to put into use the Bonwill dental engine in surgical operations, and through the aid of Dr. M. H. Cryer he has made this the most valuable of all surgical appliances.

It was the late Dr. Atkinson's often expressed conviction that "Dr. Garretson was the greatest oral surgeon of the world." Whether this were true or not, he had few if any superiors.

His work, "A System of Oral Surgery," is a monument of labor, and however much some may regard such a book as unnecessarily voluminous, it still remains the only one of its kind, and its issue marked a decided advance in dental training. While the constant demand for new editions of this work absorbed much of his time, he found sufficient leisure in his busy life to write other books under the *nom de plume* of John Darby. These include "Odd Hours of a Physician," "Brushland," "Nineteenth Century Sense," and "Man and His World." These added to his reputation as a thinker and philosophical writer.

His lectures on philosophical subjects, delivered at the College, will be remembered by those who heard them in their entirety, as containing some of the deepest thoughts conveyed in a most entertaining manner and with the least possible attempt at superiority.

His love of the philosophy of all ages was deep and profound. His studies in these directions tinged all his writings and addresses, and led many to turn away from them as peculiar; but they were only peculiar in that they were out of the common ruts of thought. To those who appreciated something more than mere platitudes they touched a responsive chord. The writer of this need only refer, by way of illustration, to his splendid tribute to the work of Horace Wells, at the Memorial Celebration in Philadelphia.

We have not space to extend this notice beyond present limits. It would be difficult to express in words the great loss the death of Dr. Garretson is to his friends, his students, the dental profession, and to the world at large. He lived that the world might be benefited by his presence in it. He led the way for others to follow, and left an example worthy of our most earnest emulation.

In response to a frequently expressed wish his body was cremated. He leaves a wife and two daughters.

THE International Dental Journal.

VOL. XVI.

NOVEMBER, 1895.

No. 11.

Original Communications.¹

A CONTRIBUTION TO THE STUDY OF THE STRUCTURE OF THE DENTINE.—THE SO-CALLED "SHEATHS OF NEUMANN."²

BY R. R. ANDREWS, A.M., D.D.S., F.R.M.S.

IF we place a tooth in strong acid, within a few days it will become wholly decalcified, and there will remain only a transparent, slimy, jelly-like mass. If a portion of this be transferred to a glass slide, covered and examined under high powers of the microscope, it will be found to consist almost wholly of tangled tubes, looking like threads, crossing the field of view in every direction. These thread-like bodies are the so-called "sheaths of Neumann." We shall find among them smaller tubes of different lengths, which are probably the linings of the fibres of the cement,—the fibres of Sharpey. We shall also see small, irregular-shaped bodies, and these are the lining of the cement-corpuscles, the lacuna of the cement. If it be a partially-formed tooth which we decalcify, we shall also find a narrow layer, which is between the formative cells and the formed dentine. In regard to these long,

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the American Academy of Dental Science, Boston, February 6, 1895.

thread-like tubes, which we shall see later on the screen, Tomes makes the statement that they demonstrate that the tubes of the dentine have definite walls, and this is the subject-matter we are to discuss later. It demonstrates the fact that they are composed of a substance singularly indestructible, and places them, on this account, with the tissues that are found on the border-land of calcification,—a tissue composed of calcoglobulin which has been deposited in a fibrous, gelatin-like substance, first formed when a tissue is to become calcified.

I shall ask your attention to a brief view of what has been written about the tubular structure of the dentine. It is stated that Leuwenhoek, a brilliant investigator of nearly two hundred years ago, who made his many and valuable discoveries by the aid of his simple microscope, was really the first to discover the structure of the dentine. He described it as composed of little tubes. About a hundred and sixty years afterwards the subject created considerable discussion,—thus Monro believed the teeth were longitudinally fibrous, and Fox that they were deposited in layers; Cuvier, that they were analogous to rock and fibrous; Serres says that there is nothing like fibres in them; Rousseau describes them as being longitudinally striated; and Blanding, who wrote as late as 1836, tells us that they are composed of plates situated parallel to their external surfaces. It remained for Retzius to discover and describe that there were minute tubes in dental bone, "and these are a peculiar kind of vessel, containing a nourishing and supporting fluid." Later in his work he contradicts this, saying, "the small osseous tubes contain only osseous earth." This is somewhat conflicting. How a tooth can be filled with osseous earth and yet allow the circulation of a nourishing and supporting fluid is in itself somewhat puzzling.

Recently, while reading Nasmyth's work on "Researches on the Development, Structure, and Diseases of the Teeth," I was somewhat interested in reading of a very eminent naturalist, who stated that a curious and interesting natural phenomenon took place. He made this statement: that the mouths of the vessels (tubes) which have been cut in the operation of stopping (filling a tooth) deposit a layer of calcareous matter through the tubes to the cut surface under the stopping (filling). This statement was made about 1838. And the late Robert Arthur, of Baltimore, held to this same theory. He says, in the teeth of our younger patients, the dentine possesses a power not generally known, of making an effort to protect itself from destruction. In a cut or broken surface which is kept clean,

the tubes exposed become filled up with a dense, ivory-like substance, and this surface seldom decays afterwards. Tomes tells us that when we are examining a cross-section of the dentinal tubes, there will be seen around the opening of the canal, when examined by a high power, a thin yellowish border, which, he says, may be the sheath of Neumann; but, somewhat uncertain, he continues, it must be remembered that the dentinal sheaths can only be fully demonstrated by processes which amount to a partial destruction of the dentine, and that therefore they are in some degree, at all events, artificial. And it may be that they have no real existence until they are brought into existence by the action of acids. In this case, all we are entitled to say is that the immediate surroundings of the soft fibrils differ somewhat in chemical constitution from the parts of the matrix which are more remote; so that under the action of destructive agents the matrix may be split up into sheathing layers round the fibrils and the more solid residuum of the matrix. Miller, in his work, "*Micro-Organisms of the Human Mouth*," holds to the tubular theory, and says that dentine may be defined as a dense, glue-giving substance, impregnated with lime-salts, and traversed by sheated tubules radiating from the pulp-chamber. They contain living matter, and by means of their many ramifications and anastomoses form a delicate net-work, particularly on the border of the enamel. He has noticed that the sheaths of the tubules are remarkable for their great power of resistance to acids. Black, in writing of dentine, speaks very frequently of the dentinal tubules. Magitot, in 1880, doubts the accuracy of the view ordinarily accepted as to the structure of dentine, denying the existence of any special walls to the tubes (he evidently means the canals), and further argues that it is undesirable to think or speak of the channels as tubes at all. He says they are not tubes in the fresh state, seeing that the fibrils are adherent to the matrix and form a part of it, and that they were originally precisely the same tissue. The existence of sheaths as distinct from the fibrils has also been recently denied by my friend Dr. Sudduth. He says that under the superintendency of the odontoblast, lime-salts are deposited around the rod-like fibrils, and thus form tubular dentine. He repeatedly speaks of tubes in the article which he wrote for "*The American System of Dentistry*." We quote him as saying that if we hold that distinct and separate dental tubes exist in mature dentine, then we must consider them as having many fine branches, increasing in number as we proceed towards the periphery of the dentine. This, he tells us, is not

consistent with our ideas of the character of a tube. No, the nature of dentine is very like that of mature bone. Again he says, the occurrence of interglobular spaces in dentine militates against the tubular theory. The dentinal fibrils pierce the interglobular spaces, and are continuous upon either side; while they make breaks in the continuity of the dentine tissue, yet they do not in any way interfere with the character or form of the dentinal processes. The fact that dentine is not capable of being broken up into tubes is, in his mind, conclusive evidence against the existence of a dentinal sheath, as the wall of a dentinal tube. (Here he evidently means the dentinal canal.) Bödecker, in his recent book, "The Anatomy and Pathology of the Teeth," completely ignores that tissue which investigators for years have called the "sheath of Neumann." In his description of the microscopical appearance of the dentine, he does not use the word "sheath" or "tube" at all. He says, "The dentinal canaliculi are excavations in the basis-substance of the dentine, each containing in its centre a fibre of living matter, and not only the dental canaliculi, but the whole basis-substance of the dentine are pierced by a delicate net-work of living matter."

This is the so-called reticulum which Heitzmann thinks he has found, and which he describes in his bioplasm theory. It is probably the fibrous substructure of connective-tissue which Mummery, of London, recently described, that serves during the forming of the dentine matrix as a scaffolding upon which the gelatinous tissue and the minute spheres of calcoglobulin are deposited. I have described the same appearance in forming enamel in a paper read in Berlin in 1890. I believe this so-called reticulum to be really the scaffolding of connective-tissue fibres, which becomes calcified with the tissue, forming matrix, and not a living reticulum in the fully-formed dentine,—the living matter coming only from the fibrils within the dentinal canals and their branches, which are found throughout the dentine. What are we to understand from the different opinions expressed in the brief review I have given you? What is the definition of the word "tube?" Webster tells us it is "any long and hollow cylinder,—a pipe." A canal he describes as "a duct in the body for the passage of fluid." A duct through which anything is conducted.

If we examine a cross section of a developing tooth, where only a narrow layer of dentine has been formed, we see on the edge of the fully-calcified layer, between it and the formative cells, the transparent, hyaline layer already spoken of. It is somewhat

irregular, as if it were formed by the merging of globular masses,—a transitional tissue, which a further stage in the hardening process will completely calcify. It then becomes matrix or basis-substance. It is formed by microscopic globules, calcospherites, which may be seen in the acts of transmigration from the blood-supply of the formative pulp to and within the odontoblasts. These cells appear to superintend the laying of the globules which are arranged in the substance of the gelatinous tissue, a layer of which has been formed by the pulp,—to receive them, they are deposited against the fully-calcified matrix. This is the hyaline layer already spoken of. It is a layer of border-land tissue that is singularly indestructible in acids or in caustic alkalies. I have stated in former papers that there appear to be two kinds of cells concerned in the formation of dentine; one, a fibre-forming cell, with a long process running into the canals; the other, a matrix-forming cell, the true odontoblast. This is usually square and abrupt against the dentine, and the processes, which it appears to have, belong to the fibre cells deeper within the pulp tissue. As the dentine layer forms, the fibre of the fibre-cell lengthens, and against this lengthening fibre this same hyaline layer is formed as against the forming matrix next the formative pulp.

Professor Sudduth tells us that the thickening of the dentinal wall is accomplished by a single layer of odontoblasts which begin the process and persist throughout the life of the pulp. But we frequently see two fibre-cells merged into one, caused by the lessening circumference of the forming dentine; they have merged together, one losing its identity completely at that point. It appears to me clear that all the branching of the canaliculi must be from the merging of these fibre-cells, thus forming branches of the main fibre. The so-called sheath then is found to be a transitional tissue. It is in no sense a separate tissue, and tubes can only be demonstrated after full decalcification when acids *have* completely destroyed the matrix. In cross-sections of the canals in dentine this border-land tissue can be stained by a preparation of nitrate of silver. It acts precisely the same as it does on the hyaline layer of forming dentine. It stains it black. Both tissues are matrix-tissues in a partial state of calcification, and full calcification will take place in this border-land tissue, against the fibre as age comes on, when the dentinal canals are found to be much smaller in diameter than they are in the young tooth. We may assume, then, that the so-called sheath of Neumann is but a transitional tissue only partially calcified, which lines the canals in

the dentinal matrix, and is only a tube or sheath when acids have destroyed its adjoining more fully calcified substance.

[The subject-matter of the paper was illustrated by some forty photo-micrographs that had been prepared by Dr. Andrews.]

WHAT HAS BEEN DONE BY THE PROFESSION IN FRANCE ON PYORRHOEA ALVEOLARIS.¹

BY C. N. PEIRCE, D.D.S., PHILADELPHIA.

It is now something over two years since considerable interest was manifested on the subject of pyorrhœa. Many papers have since been written, and much notice has been given the subject in the journals, but to-night I propose to present the views of a few of the early writers and some more recent ones of France, that these may be contrasted with what has been already published.

That pyorrhœa alveolaris is not a disease of recent origin or due to modern constitutional states alone is very evident from examinations of the skulls of ancient races. The alveolar process of crania, widely separated in time and locality, exhibited marked impairment in structure and hold a very close resemblance to that presented by more modern processes which were known to have been the seat of pyorrhœa during life. The earliest dental surgeon to record his observations was M. A. Fauchard, who, as early as 1746, fully recognized the disease in all its essential features, but failed to designate it by any specific name or term.

M. Jourdain, in 1778, described the disease as "a conjoint supuration of the gums and alveoli." Regarding the inflammation and suppuration as expressions merely of a constitutional scorbutic state, he advised "the extraction of the teeth as affording the only possible means of cure."

M. Joirac, in 1823, called the attention of the surgical world to this form of inflammation, which, from its most characteristic symptom, the flow of pus, he gave the name of *pyorrhœa interalveolo-dentaire*. That he recognized this disease seems evident from the statement that the gums became swollen and spongy, the suppuration abundant, the teeth loose and painful, and finally fall from their sockets.

¹ Read before the Odontological Society of Pennsylvania, September 14, 1895.

M. Marchal de Calvi, in 1860, spoke and wrote of the disease as a gingivitis, having for its results the expulsion of the teeth,—"gingivite expulsive" he termed it. He regarded the disease as hereditary and caused by the deposition of tartar, also that it was incurable unless all the teeth were removed.

In 1867, Dr. E. Magitot published his paper, which was the most complete systematic description of the symptoms and pathology of the disease which had up to this time been found in print. He commences by stating "that under certain circumstances individuals experience a premature, progressive, and continued loosening of one or more teeth, accompanied with abundant suppuration of the alveoli, with inflammatory phenomena of the gums, fungus excrescences, abscesses, and other peculiar phenomena, without the teeth themselves presenting any apparent structural change, and that this affection, if left to itself, finally ends in the loss of these organs." Magitot is fully impressed, as a result of his studies, that the gum, being in all cases only attacked subsequently, is not the real seat of the lesion. The disease with which we are occupied, he says, "seems essentially characterized, from an anatomical point of view, by a slow and progressive destruction of the periosteal membrane,—a destruction of an inflammatory character, of chronic progress, proceeding from the neck to the end of the root, and leading, without fail, to the loss of the tooth. This special feature, its mode of origin, and the precise seat of the lesion, seem to justify the name *alveolo-dental periostitis*. But notwithstanding its primary origin in the periosteum and its complications with the gum and bony alveolar wall itself, the study of the successive morbid phenomena does not allow us to admit, as various authors have claimed, *that these parts are originally the seat of the disease*."

We should only need for proof the isolated localization of the trouble in one or more teeth without necessarily being communicated to those adjoining, the situation of the anatomical lesion, the special sign of the lesion, and, lastly, of the fact of constant cure following the removal of the affected tooth. These reasons, he says, "should more than sufficiently prove that it is the tooth and not the gingival tissue or any other part which should be regarded as the seat of the disease." Dr. Magitot then gives a clear description of the disease's progress, which is not necessary to mention here, beyond his etiology, which he gives as follows:

Etiology.—"The causes of this affection are quite complex, and should often be looked for, not in a local condition of the mouth or gums, but in certain conditions of the general health.

"The disease ordinarily attacks either one of the teeth singly, or several of them; but in this latter case the teeth affected are not necessarily contiguous.

"The age at which this affection appears is generally neither adolescence nor advanced age. The usual period is from thirty to fifty years. It seems equally frequent in men and women, and in the latter it often appears among the complex phenomena of the menopause.

"Certain intestinal phenomena are observed either in coincidence or in etiological connection; habitual constipation is noticed in affected patients. A physician of the Paris hospitals, Dr. Vidal, has noticed that these same patients often show dyspeptic phenomena. Perhaps these were due to difficulties of mastication. In all cases we have had personal opportunity of verifying this assertion. Gouty and rheumatic persons often show it. Those attacked by anæmia as a result of long illness are in the same condition, but there are no general troubles which exercise a more serious influence in producing the disease than albuminuria, and especially diabetes. By the first we mean here, of course, not symptomatic albuminuria, but Bright's disease, properly so called.

"In glycosuria this phenomena is absolutely continuous, and even constitutes one of the earliest signs of the diseased condition. We find, in fact, in the description of most authors, that at the beginning of diabetes the teeth are observed to loosen and decay. This assertion, as regards caries, is not correct, but the first is perfectly so, and corresponds to the osteo-periostitis, which follows in its development the same progress and advance as the general disease to reach the terminating period of the latter in the loss of a considerable number or all of the teeth."

The treatment of pyorrhœa, as suggested by Dr. Aguilhon de Serran, is especially interesting. He speaks as follows:

"I shall limit myself to a short discussion of the nature of the lesions and the treatment by means of which I have succeeded in conquering them.

"Suggestions for treatment are naturally derived from anatomopathological study. In the first place you must relieve the fibrous mass of the liquids which separate it, then excite the vasomotor action and favor the formation of new vessels and fibrous tissues. Chromic acid fulfils these indications to a certain point: it hardens and retracts the fibrous tissue and acts on the membrane as a powerful revulsive, and has therefore, in the hands of Dr. Magitot, given very good results. But it only acts superficially, and is only

of use at the beginning of the disease. Besides, it cannot destroy the purulent burrows, the principal cause of the continuance of the trouble.

"The other methods of treatment have fallen into disuse. In most cases it is necessary to extract the teeth, one after another; and, as they are generally free from all decay, patients only decide to have it done after suffering for years, or when the stomach becomes affected as a result of insufficient mastication.

"After many fruitless attempts I had recourse to a very simple mode of treatment, which answers at once the several indications of which I have spoken. It consists in traversing the bottom of the burrow by a seton of floss silk which is left in place. It causes no inflammatory trouble. From the first the patient experiences great comfort. The unstable teeth, projecting outward, are rapidly brought back by the contraction of the fibrous tissue. Their firmness is perceptibly increased from the first hour.

"I have treated eleven patients in this manner, and I have always obtained the cessation of all pain and the strengthening of the teeth, in proportion, of course, to the extent of the destruction of the socket.

"As regards suppuration, the results are less satisfactory. It was only entirely stopped in two patients,—those in whom the disease was furthest advanced.

"I was anxious to present to you a lady whose case is curious from several points of view. Unfortunately, she is prevented by rheumatism from being present. When she consulted me this lady had been suffering for ten years. She could only eat soaked bread. She has only three molars, but she has all her incisors and three canines. She was treated for a long time with chromic acid. She even applied it so often that the roots, almost entirely exposed, are dyed a deep green. A few setons were sufficient to cause the disappearance of both pain and suppuration. The teeth are firmer, but, owing to the great reduction in their means of attachment in consequence of the absorption of the sockets, they will continue loose.

"Another patient was cured under the same conditions. All the others happened to be in a much less advanced state of the disease.

"From the first, without exception, the pain ceased and the teeth have become firm, but the suppuration reappears from time to time, in some cases at very remote intervals. I think this fact may be attributed to two causes: first, that I did not leave the setons in place sufficiently long. Fearing some trouble, I thought

it prudent to remove them from the fifth to the eighth day; but it seems to me there is no objection to keeping them in for several weeks. The second cause is the difficulty of the manual work. It is impossible to pass needles through the walls of the alveolus, and consequently to reach the lowest limit of the burrow. For this there must be invented a special instrument which I have not yet been able to make satisfactorily.

"A general treatment should be prescribed according to the case. I have obtained good effects from chloride of magnesium, whose action on the smooth fibre is most decided, and which produces besides a laxative effect almost always necessary. I propose to try, with the same object, injections of ergotine."

This ends my quotation, but I would say in closing that I have been asked several times whether, after three years' experience, I have still the same confidence in constitutional treatment in connection with local treatment that I had in the beginning. I can say most emphatically that the success with which many patients have been rewarded has been most satisfactory. I am firmly convinced that in a very large proportion of cases of pyorrhœa, where they have not gone on to the extent of the teeth loosening all hold, by the sockets being completely destroyed, they are benefited by careful constitutional treatment, embracing proper diet and the application of proper remedies in connection with local treatment. So that every day I am applying these remedies, and the patients say they are compensated fully in doing so.

JUDGMENT AN IMPORTANT FACTOR IN THE PRESERVATION OF TEETH.¹

BY FREDERICK BRADLEY, D.M.D., NEWPORT, R. I.

THE world is greatly indebted to the enthusiasts, extremists, and radicals, and, paradoxical as it may seem, the world is also greatly indebted to men of moderate views, the judicial and the conservative.

A lady from abroad, who is prominent in public affairs, recently said that when a man stands alone for his belief or ideas he is called

¹ Read before the American Academy of Dental Science, Boston, March 6, 1895.

a fanatic; when a limited number are his disciples, he is called an enthusiast; but if his belief or ideas are worthy of general acceptance, he is a hero.

Abundant proof can be furnished showing this to be true in all professions, particularly in theology and medicine. Hahnemann, who may have been looked upon as a fanatic or an enthusiast, is now held to be something of a hero by at least a part of every community, and it is generally conceded, I think, that his influence on general medicine has been, on the whole, beneficial.

While it may be said, broadly speaking, that all great reforms, and even innovations, need the enthusiasm and earnestness of the fanatic to arrest the attention of the masses, it is equally true that not every instance of fanatical, or even enthusiastic, devotion to an idea is proved in the end to be founded on true merit; and it is an excellent safeguard which the average mind of the masses interposes between the chimerical and the welfare of humanity, refusing to follow or to be led by every will-o'-the-wisp who labors under the impression that he has a mission to fill.

No doubt many of the isms which come to the front at one time or another contain the germ of some idea valuable in itself and of undoubted service when used with judgment. But, on the contrary, if it should be taken up by the extremist or radical, its real worth is frequently lost entirely, or so obscured by exaggerated claims that its period of usefulness is much curtailed.

Before applying these principles to our own profession let us look a few moments at the material which we have to work upon and the end which we hope to accomplish. In my student days I remember hearing a prominent professor make the following statement concerning the human eye: "If the modern oculist was to make as imperfect an optical instrument as the average human eye, the probabilities are his occupation would be gone; but," said he, "we must bear in mind the nature of the material from which the eye is made, how it is subject to the laws of decay and repair, and, taking all things into consideration, it is undoubtedly a good organ."

If this is true of the eye, what may be said respecting the teeth? The influence of one's ancestors, according to the laws of heredity, the large or small number of children in a family, well or poorly nourished condition, the influences of a varying diet, the occupation of the individuals, sedentary or otherwise, the care exercised in cleansing, the ever-varying condition of the saliva,—all these conditions are important factors in determining our method of procedure.

And what do we hope to accomplish? First, the relief and prevention of pain; secondly, the preservation or restoration of useful organs of mastication; thirdly, to retain or develop an attractive appearance of the mouth.

Bearing these conditions in our mind, is it not presumptuous of any dentist to claim the ability by any single special or individual method to accomplish the desired end? And yet we do hear of men becoming so wedded to an idea or a method of work that their enthusiasm leads them to ignore, and sometimes to deery, much that is good and useful, because, forsooth, it runs counter to their pet theory.

Let me go a little more into details. Is it wise for a dentist to boast that under no circumstances would he extract a tooth or advise its removal? I may be mistaken, but I do believe we may in many cases do our patients the greater service by a judicious use of the forceps. It may be in a case of regulating, or in a persistently troublesome case of pyorrhœa alveolaris, or, possibly, simply to relieve pain in stubborn cases, or in the mouths of those unable to pay for more conservative treatment, and yet we hear occasionally of some one who claims he can save all the teeth, and it is the duty of all dentists to do so. Twenty-eight teeth, or even less, in fairly good condition are preferable to thirty-two crowded and ill-conditioned teeth.

It is my privilege as an instructor to encourage students to ask questions and think for themselves. I have been asked such a question as the following: "What is the best way to treat and fill a pulpless tooth?" "Because," said the student, "I want to know the best way, and I will do it so every time." My reply is, I know of no way that is best in all cases; that as the "punishment must fit the crime," so the remedy should be according to the diseased condition, bearing in mind the desired result,—viz., a perfectly aseptic condition of the pulp-chamber and canals and a filling in the root that will exclude moisture, and I think an experienced judgment will not always suggest the same methods or material.

A few years ago there was quite a hue-and-cry about implantation. Many demonstrations were given, papers were read describing and advocating the operation. Some of the more enthusiastic advanced such exaggerated claims for this operation that, compared with the results shown later, such claims were, to say the least, unwise. I believe there is something of value in it,—there are cases where the successful implantation of a tooth would be a consummation to be most ardently desired,—but to recommend the im-

plantation of a few roots and the attachment thereon of extensive pieces of bridge-work certainly seems to be the dream of the fanatic.

And this brings us to the consideration of bridge-work from the stand-point of this paper. Do we not see evidences of the presence of the fanatic frequently in our own practice, and daily in the advertisements of the daily papers? That the insertion of suitable pieces of bridge-work is a legitimate undertaking, both movable and immovable, no doubt we should all agree. But should we not hesitate and make haste slowly when it comes to cutting off and grinding down good and useful teeth for the purpose of inserting what may be merely an experiment? Have not the extravagant claims of these fanatics in a measure disgusted, or at least discouraged, the more conservative, causing them to hesitate in attempting anything in this line? Here is a field for the exercise of an experienced judgment, that will carefully weigh the advantages and disadvantages impartially, and that does not look upon a difficult and complicated case as an opportunity either for experimentation or to show off the skill of the gold-worker.

Possibly in the use or choice of filling-materials and the methods of manipulation do we find the most important occasions, when we should use judgment in our work. When we hear of men, prominent in the profession, who openly speak of their intention to confine themselves to the use of plastic filling-materials, and others who think no metallic filling should be made in the teeth until the patient is upward of twenty years of age, and, on the other hand, equally prominent and conscientious men who use gold and other metals even in deciduous teeth, certainly it is not surprising that the young student should ask for some authoritative instruction as to the course he should pursue. For my own part, I believe we should be guided by the conditions presented. The indiscriminate use of gold in teeth of a poor texture, whether for children or for persons in delicate health, must undoubtedly cause much suffering, and very frequently fail to accomplish the purpose in view; and, on the other hand, to continue the use of plastic materials when the teeth are hard and of good texture seems an unnecessary waste of time, as the work will need frequent replacing.

Let me instance a case. Suppose the tooth to be of a fair quality, the patient twelve years old, the deciduous teeth gone, the six-year molars filled on grinding-surface with cement, and we find small or medium-sized cavities on the mesial surface. In such a case, would it not be better to make a gold filling on the mesial

surface, because of its exposed view, and leave the cement filling on the grinding-surface till it needs further attention?

As to methods of manipulating gold, we are told by one that purely soft gold, rolled into cylinders and wedged into the cavity, is the best; another will use cohesive foil entirely, with automatic engine or electric mallet; another uses no mallet, but thinks hard pressure is the ideal method; and only recently we listened to a most interesting paper claiming that gold should be burnished into the cavity. In answer to the student who asks which is the best method, what shall we say? I think it well to advise him to become expert in each method of manipulation; and the probabilities are that nine out of ten students will not use any one method exclusively when they have been in practice five years, but a combination of two or more methods, because their experience has taught them how to work to the best advantage in saving their own strength with the minimum of discomfort to the patient.

Some time ago a dentist told me that he had not only discontinued the use of carbolic acid and creosote, but he had cleared them out of his office. Possibly these drugs may have been superseded by some others for certain purposes, yet I venture to say there are occasions where one or the other might be used to advantage. In the summer months I occasionally see a lady whose teeth are said to be in the care of a prominent Boston dentist. More than once the trouble has been with pulpless teeth, and she states, with every confidence, that unless the canals are filled with cotton and creosote she knows they will be troublesome. Now, while I may not agree with the idea that cotton and creosote are the best to use for a root-filling, I allow the lady to have her own way, and she leaves my office free from pain and satisfied in her mind.

And right here I wish to say a few words as to accepting the suggestions of the patient. No doubt we all have patients who feel called upon to suggest little things at times, and I think we have a duty to perform in deciding a right how far we shall listen to such. Of course, if we are consulted, we very naturally expect our advice to be followed, and wherever a principle is involved we must decide for ourselves and the patient; yet there are occasions when it is well to heed the expressed preferences of the patient. I have known of a case where a young person, needing to have a tooth removed with the use of an anæsthetic, preferred cocaine to be injected; but his mother wished him to have nitrous oxide. After the operation nothing could convince the boy but he knew all the details of the operation, and I have no doubt the result would have been more

satisfying to him had we used cocaine. While it should be our intention to do all our work so thoroughly that it may stand the most rigid examination, there are occasions when our judgment should indicate that we must be satisfied with doing the best we can under the circumstances, bearing in mind that all patients cannot, or will not, submit equally well to the necessary pain and fatigue generally experienced in building up show-pieces of our work.

Some time ago I was very frequently in the company of a number of young school-teachers, and I was impressed very forcibly with the idea that some of them seemed to think—or, at least, act and talk as if they thought—that the scholars in a school were sent for the purpose of supplying raw material whereon the teacher might develop or exhibit some special theory of teaching, instead of being there to acquire an education. I think we should never use our patients for such a purpose. Let us make beautiful gold fillings where suitable, make and insert crowns and bridge-work, and, when a cultivated judgment indicates it, use the plastic material for fillings. Do not be afraid to say that in our judgment such or such a course would be the best to pursue.

I know sometimes the young school-teacher would be greatly annoyed because a pupil less quick to apprehend the instruction than the average of her class interfered somewhat with the development of the pet theories; and if we treat all our patients in the same inflexible way, we shall find that our pet theories are sometime completely overthrown.

It cannot be supposed for a moment that the various methods of operating or manipulating are the result of accident, any more than the different filling-materials came by chance, or the remedies used in our *Pharmacopœia* are the effects of a blunder. Much has been developed because the spur of necessity acted as an almost unfailing stimulus to progress; so let us not throw the results to one side hastily, for there is generally something of value in all processes and remedies.

To recapitulate, the usefulness of the enthusiast or radical consists largely in calling the attention of the general public to what is new, or a new use of something old. The usefulness of the moderate or conservative man is to weed out the good from the bad, and, in a measure, act as an antidote to the enthusiast.

The injury which the enthusiast may do consists in over-statement and extravagant claims, thereby leading the unwary and easily influenced astray. The injury which the conservative may

do is in resisting the new because it is new, and in thinking and saying that the old ways are good enough for him.

So, in our profession, those who cultivate a fad or ride a hobby, whether it be the ignorant charlatan who wields the forceps with more zeal than discretion for the purpose of making an artificial substitute, or his opposite, who never extracts a tooth; the boastful bridge-worker, who will make a full set of teeth and fasten them to four or five roots, or the man who never attempts even to put on a crown; the renowned gold-worker, who believes in the precious metal first, last, and all the time, or his equally renowned professional brother, who never uses gold, but believes in gutta-percha and the cements,—all these should, we believe, make the exercise of judgment a prominent factor, modifying arbitrary methods and their use of materials in a cast-iron rule.

CAUSE AND BEING OF TEETH.¹

BY HENRY H. BURCHARD, M.D., D.D.S., PHILADELPHIA.

THE subject of this essay is that of the cause and being of teeth, and, incidentally, some few observations as to their embryology and histology, some few loose comments upon the interdependence of function and structure. It is most certain that in the struggle of organisms for existence there is no such surplusage of vital force that any of it will be wasted, so that in its distribution, as evidenced in the formation of tissues and organs, we shall surely find that whatever organ or part is formed has its use, and comes only into being to supply an animal need. Instances of seeming variation from this, such as the colors of flowers or birds, and so on, which appear to be but for mere ornament, are delusive, for even in such cases utility is the end, not mere adornment.

There is distributed to and expended upon a developing part, and afterwards in its maintenance, no more energy than is needed. Nature's economy is finely adjusted, and there is rarely built more than is necessary. Variations, if they occur, take the line of minus more frequently than plus. Many writers upon physiography speak of the lavishness, the wastefulness of Nature, as evinced in

¹ Read before the Edwin T. Darby Society, University of Pennsylvania, February 25, 1895.

the loss of energy by the diffusion of the sun's heat, but it is more than probable that our egotism is at fault here, and, although this planet may not be the beneficiary of all the sun's energy, it is not wasted for general cosmic purposes. To return to an organism, just so much energy is expended in its formation as is needed to put it in harmony with its future environment. With this in mind, whatever is our specialty, we may examine the parts immediately concerning us with the assurance that every part, even those most microscopic, forms a means to an end, and no inquiry as to the matter can be too exhaustive.

The human tooth is our subject, or, for that matter, the teeth of any of the vertebrata. To make analogies closer, teeth of one type are selected, those having a continuous enamel surface, supported by dentine, and this in its turn by cementum and the membrane which gave origin to it. These and their supports, down to the mandible, are a means to an end, and this end the preparation of the food for the chemical solution which we call digestion. As teeth are the basis of our reasoning here, we assume the conditions which demand teeth. For these latter, obviously the first consideration is a substance and surface composed and shaped so that the usual food of man may be divided and crushed,—comminuted. That this office demands the greatest extent of hardness of the substance performing it premises that Nature will set aside special provision for its production, and that this provision will show an elaborateness according with the extent of organization.

Contrary to usual methods of exposition, our argument carries us now, not to the part immediately contiguous, but to the general support, the maxillæ and the motive apparatus. These must needs be of sufficient resistance and power to withstand the forces applied in mastication. Added to this, the lower jaw is a lever of the third class, and the resistive power must be increased just in the ratio of the distance of the weight from the fulcrum and of the power from the fulcrum,—the power, the force of the muscles in mastication; the fulcrum, the temporo-maxillary articulation; the weight, the resistance offered by the food in mastication.—so that the longer the inferior maxilla, the more dense it should be; also the more powerful the muscular action, the more dense and thicker should be the bone. Direct muscular force plays no part in mastication, as all the teeth are anterior to the lines of insertion of the muscles of mastication. The differentiation of an organ for the formation of enamel and the beginning of a bony formation in the substance of the embryonic jaw occur before there are any evidences of cells being

differentiated for the production of dentine. That, in spots, what Dr. Sudduth has described as interstitial formation of bone is taking place about as early as the purpose of the epithelial infolding becomes evident.

This arrangement is a verification of the reasoning which makes dentine formation secondary to that of the enamel and the maxilla. The recalling of the existence of the slide was an accident which, fortunately, supports the arrangement selected.¹ The amount of force expressed in the leverage demands for resistance more than a mere vitreous surface, such as the enamel,—this should have a firm basis of support,—hence dentine, or some substance resistive and firm, yet of less density than the enamel, becomes a necessity. As the office of this is for support, not crushing, Nature's economy does not permit of any more elaboration than enough to meet the needs. This structure requires support and of another grade, less firmness. You will see there is a progression of the degrees of elasticity provided, and the modified bone cementum is supplied. These combined structures need fixation and support, and the alveoli are furnished. There is no instance in the body where provision is not made for the prevention of shocks, as you will see from an examination of Nature's provisions in the arrangement of articulation, their shapes and angles, histological anatomy, etc., in the viscera, of their means of support by properly arranged ligaments, and further by elastic capsules.

So, in common with other organs, this has its ligament and elastic support combined in the pericementum, a nutritive membrane, an elastic semi-capsule. The arrangement of some of the fibres of this membrane is of such a character as to form a cushion for the tooth, and this is its provision against shock. The cancellated structure beyond the alveoli acts as a subsidiary to the cushion, as may be seen by its peculiar arrangement.

The force of impact is next upon the bone, and beyond this to the base of the brain, but there are several provisions between, which reduce the amount of shock at that point. The angle of the jaw, breaking the direct line of the force, is one; the elastic cartilages second; and the angle which the perpendicular line of the ramus of the mandible makes with the plane of the base of the cranium another. An instance of where this force comes at a right angle is in what is called the knock-out blow of the pugilist. Delivered as this blow is, it is as though a straight bar extended from

¹ American System of Dentistry, vol. i., Fig. 356.

the centre of the articulating head of the maxilla to the point where the blow is received, about beneath the bicuspid teeth.

The elasticity of the tissues supporting teeth subserves another purpose, and that is an adjuvant to the local circulation. As you no doubt know, there are several auxiliaries to the cardiac force in the circulation. Prominent among these are the mechanical forces exerted by elastic tissues, muscles and their sheaths. Any force which produces changes in shape, position, or size of a part serves the same end. The force of mastication, stretching the fibres of the pericementum, pumps the circulating fluids of the parts.

You will perceive from this that an increasing density of teeth and their supporting structures, through a lessening of this elasticity, will reduce the amount of this auxiliary force to the vascular system. This may proceed to such an extent that a condition of vulnerability is produced. A lessening of evident cellular elements and an increase of highly organized tissue may be carried so far that a tooth becomes almost like a foreign body in its own socket. This may, in fact, be the determining element in locating a specific inflammation in the pericementum.

You will perceive that in the normal contact of the lateral aspects of the teeth the contact is by but a small surface or point, so that each tooth has independent movement in mastication. Irregularities of the teeth frequently lessen the independent movement by offering an increased surface of contact. Apropos of this checking of movement, if you will consider the nature of the relations established through the use of fixed bridges, you will see that there results inevitably a change of nutritive relations as to the pier teeth and their supports. This may or may not be of much moment in practice, but still it forms an item for consideration.

The transmutations of epithelium form one of the most remarkable series of phenomena in all biology. A mere cursory (students will readily detect a twofold significance of this word in connection with embryology), even a superficial examination will show the multitude of offices performed by epithelium. Up to the part played by this structure in the formation of the central nervous system, and we may trace the steps of organic evolution very, very low in the scale of cellular organisms,—that is, a stage above the unicellular,—the periphery is the receptive part, and so on through various elaboration of function there is a modification of what was originally a peripheral part. Among all the peculiar variations of epithelial structures there will be found none more remarkable than that producing the enamel of the teeth. As the first office of the

tooth is that of dividing and crushing, we look naturally for the earliest formation to be that of a structure designed for its production. An examination of a fetal jaw will show this to be true, that, antedating any other evidence of cellular differentiation pointing to tooth-formation, there will be found a definite, linear, bounded activity of the epithelium covering the summit of the jaw.

That this *is* a defined hyperactivity is seen by the rapidly multiplying cells causing a rising ridge. However, this rising is a secondary effect, with no other significance than the presence of a greatly increased number of germinal cells underlying a given area.

The upheaval is increased in extent according to the depth or cubical contents of the involution. The next stage in the progress of this differentiation, the base of the cylindrical (in fact laminal) infolding appears to meet the resistance of a cone, as a depression begins at the middle of the base. The supports of the masticating and incisive organs, approaching the latter in importance of function, are developed almost simultaneously, the mesoblastic tissue partakes of the activity and increases, so the epithelial cap, as it now is, is left deep in the cellular mass. At the same time indications of the future jaw are beginning to appear. From a common band elements corresponding to individual teeth are separated, and single teeth are now in process of development. The enamel organ assumes more of the form of a tooth crown. The space between the two layers of epithelium, made by reduplication, becomes distended. A fibro-vascular coat forms about its exterior. The periphery of the mound it encloses is seen to have a distinctive layer of cells formed upon it, blood-vessels become more evident in the mound, and the dentinal and enamel organs are ready for their work of elaboration. The alveolar walls are seen in process of formation, and soon indications of a periosteum appear.

In connection with the future of the processes under discussion, there are several controverted matters. It is possible that some of you will supply the missing links. Theoretically, a new generation of practitioners should begin where the last closed their labors. It does not take many years to make a professional generation, and you have a good basis in the work which has already been done, and so the expectation is no extravagant one. Prominent among the matters *sub judice* is that of the exact manner of formation of the enamel and dentine. The details involved and to be solved are those connected with the peculiarity of cell action, which determines the forms of the enamel and dentinal elements. The transi-

tion there is between matter on one side of cells and formed products on the other. This intermediate ground is the matter which should engage your attention. The solution will no doubt be found through some improvement in the technique of histology.

As to enamel formation there are two prominent hypotheses. One that the enamel is deposited in the extremities of ameloblasts, that these cells elongate as the deposition proceeds, so that, according to this view, an enamel prism, throughout its length, is a petrified epithelial cell. The next hypothesis is that enamel is a secretion exuding from the distal ends of the ameloblasts, and that this secretion becomes hardened, petrified into enamel. Sudduth states that individuals of calco-globulin spherites coalesce when in contact.

Personally, I incline to a belief which includes these two processes,—that the ameloblasts, which form a layer of persistent, prismatic epithelial cells, are in a state of constant reproductive activity, and that the progeny holding calco-globulin as cell contents are being placed at the distal ends of the ameloblasts. It appears to me that this is more in accordance with the general rule of epithelial development.

Another matter requiring solution is that of the formation of the transverse processes in dentine. You are, of course, familiar with the minute structure of dentine. In this connection there are several obscure matters connected with the study of the minute anatomy of the dentine, its embryology, and, last, its vulnerability, which you gentlemen may at some time solve.

Of the period of dentification, covered by the beginning and ending of root formation, there is a paucity of literature and a lack of observation. This offers an inviting field for any of you who are interested in histology.

Another matter which seems to be undetermined, and one regarding which many have speculated, is the composition of Nasmyth's membrane. You will observe that a tooth-sac has, between the formed enamel and the tissues immediately contiguous to the outer layer of the sac, the following parts: a fibro-vascular membrane, which is said to form the pericementum; an external epithelial coat to the enamel organ; the remnants of the stellate reticulum, and the ameloblastic layer itself. Now, unless it can be shown that one or more of these layers are lost during the process of eruption, each must form a layer of Nasmyth's membrane, and with this addition, that the layer which becomes the pericementum may deposit a layer of cementum. I believe this

has been observed. Thus the skin of the teeth may consist of five layers. Even should the fibro-vascular layer be pierced, and the tooth-crown emerge through the aperture, it would have the three epithelial layers at least as coating. We have discussed something of structure, and now to the matter of the forms of the teeth. The classes of teeth will be found to have forms and positions adapted to special purposes: incisors for primary division, cutting, or incising; bicuspid for half cutting, half crushing; molars for little cutting and much crushing.

In this immediate connection I ask your careful attention and study to the work of Dr. Bonwill as to occlusion. I am debarred on philosophical grounds from agreement with Bonwill as to the cause of teeth, but in relation to most of his views as to their being there can be no conflict and no question of the immense value of his work and studies in human articulation. Virtually, his argument is that design begets want; as you no doubt know, the general opinion of evolutionists is that want begets design; and the truth of it—well, perhaps it lies between.

As to these three classes of teeth, examine the cuts of Bonwill as to overbite, and see how the amount of this corresponds with the function of the particular tooth; also, the arrangement of the cusps which gives the greatest amount of utility commensurate with structure.

One point Dr. Bonwill demonstrated to the writer, which does not appear to be in works on odontography,—as to the function of the cuspids. As you are aware, these teeth are assigned a part in prehension,—that of locking. Dr. Bonwill shows that an important function is that of guiding the bite,—that is, in the carnivora, where these teeth are most prominent (as teeth), the surfaces of the canines meet, and are guided to closure in such a manner as to cause the molars to act as shears. Dr. Kirk has the skull of a baboon in which the same arrangement is seen. In this case the provision is doubtless for cracking nuts, not bones, as in the carnivora. This function pertains in some degree, or rather the necessary degree, to the cuspids of man. The palatal aspect of the superior canine, it will be seen, is composed of two inclined planes.—one mesial, the other distal. Against these planes occlude parts of the labial aspects of the inferior cuspid and bicuspid. The action of this occlusion would be upon an interposed substance in the main incisive, but added to this would be a squeezing, as in a rolling-mill. This gives the first bruising to the morsel of food. When the apex of the superior cuspid is in contact with its in-

terior occluders some space will be seen to exist between molars and bicuspid, perhaps enough to admit the bruised morsel of food. Now, these occluding surfaces guide the cusps of the molars and bicuspid into a shear-edge occlusion.

You will observe that the amount of overbite of the first bicuspid is greater than that of the second; necessarily, it will receive a greater strain than the second during mastication. Nature's provision against this strain as to support will be found in a bifurcation of the root of the first bicuspid, thus widening and increasing the base of resistance.

This is but one fact as to the roots, and I think a new one. Apropos of this, Dr. Kirk suggests to me the reason for superior molars having three roots. That the mandible and its masticating surfaces is the movable stone of a mill, the superior maxilla and its masticating surfaces the base stone, which requires more firmness than the movable; hence the extra root.

The root arrangement is in such manner as to offer the proper support to each type, and each is so shaped as to offer the proper resistance to the applied strains. Those of the superior incisors, somewhat triangular on section, the base anterior. That of the cuspids nearer an ellipse, for the strain is divided. In connection with this root note the prominence of the process overlying it and the length of the root. It is the tooth of the mouth which has least support from other teeth during one stage of mastication.

The inferior incisors, to most effectually resist the strains against their roots, should show sections triangular at the neck and a reversed triangle at the apex. The arrangement is a compromise, as these roots have an elliptical section.

Dr. Bonwill has explained, or no doubt will explain to you at some time, the mutual support derived from the arch arrangement of these inferior incisors.

There is a mechanics of embryology which determines in large part the shapes, sizes, positions, etc., of anatomical structures, or at least helps to determine them.

This is a lengthy subject, and one of which but little has been written.¹ Its treatment and discussion will involve much labor and thought, and will serve for some future discourse.

¹ Dr. Ryder, in the Proceedings of the Academy of Natural Sciences, contributed some twelve or fourteen years ago an exhaustive study upon the mechanics of tooth-formation. Later, the work was epitomized by Dr. C. N. Peirce.

The conditions described in the paper are as to present existence, and the effects of mechanical causes are included in the results. It does not require extensive observation to demonstrate that the mechanical aspect plays a prominent part in the determination of form. The practical result, the object of all this work which concerns us, is, of course, the preservation of the teeth.

In this connection permit me to call your attention to one fact which seems to be frequently overlooked, and that is, this preservation should be with a view to utility; this the comminution of the food; and all our efforts at conservation should be directed with that end in view. Teeth retained should do work,—should be put in such condition that they may do this effectually. This involves the filling of teeth, so that the filling should represent a restoration of lost parts, for if we diverge from this the tooth has its usefulness lessened to the extent of divergence.

As before stated, Nature does not build uselessly, so the amount of energy she has expended in elaboration of the masticatory apparatus is just so much as its importance demands. That in the mammalia she stops tooth formation anterior to the fauces is positive evidence that the work of mechanical subdivision of the food should be done in the space occupied by teeth. As she has substituted in the stomach chemical for mechanical operation is proof that she designs that food shall be presented to this organ in condition for chemical solution. This makes a curious medley of material, disconnected, and perhaps not as clear as it might be. Running through it, I think you will see that Nature shows no better examples of the conservation of energy than in organized creation. The evidences are somewhere, in fact everywhere, and it will serve as a pleasurable exercise for you to detect them.

Do not think that these matters are of no moment; they are as important as any with which we have to deal. Oliver Wendell Holmes, in one of his books, describes an experiment in the developing of infusoria. At its conclusion, the experimenter, as he watches the tubes, exclaims or muses that the fate of the Roman Catholic Church is contained in that vial. The experiment was one in the investigation of the possibility of spontaneous generation. And so it may be in the scientific aspect of dentistry. There may be some one point apparently obscure and of little importance, and yet, intrinsically, it may outweigh in importance the results of years of practice of the most skilled clinician.

All things are comparative, and human vanity is constantly receiving shocks as to its estimation of comparative worth. And

now, as the clergyman says, one word more and I have done. Just one hint. A text-book will state that O is a bivalent element; but few words, gentlemen, but change the fact of that condition and the universe would change with it.

[The subject matter of this essay was illustrated by numerous black board diagrams and drawings, most of them modified outline drawings from the several text-books of anatomy and histology; others by appropriate slides of histological preparations.]

Reports of Society Meetings.

AMERICAN DENTAL ASSOCIATION.

(Continued from page 630.)

August 7, 1895.—Second Day.—Morning Session.

THE meeting was called to order by Dr. Watkins, the Vice-President, Dr. Crawford still being ill.

The secretary read the minutes of the previous session, which were approved.

The secretary moved that the communication read by the corresponding secretary regarding the Memorial Museum be referred to the Committee on the Horace Wells Memorial, of which Dr. Thomas is chairman. Carried.

The secretary read a communication from the Dental Society of the State of New York in regard to restraining the use of secret nostrums and preparations. The same was referred to the Section on Materia Medica. Dr. McKellops asked to have the resolution which was adopted in Boston, relative to the same matter, read before this Association.

Dr. Walker, of New York, moved a vote of thanks to the Mayor of Asbury Park for his kindness in extending the courtesy of the borough to the American Dental Association and in sending the band to furnish music, which motion was unanimously carried.

DISCUSSION OF PAPERS READ LAST EVENING.

Dr. Stinton.—It is a little unfortunate that the combination of circumstances is such that papers requiring a great deal of care

and preparation have to be passed without much discussion. I want to reiterate a point or two I made last night. I think some of the lessons drawn from the study I made should not be lost sight of. It is very easy to manufacture dental schools. To manufacture them of good character is another thing. We should pay some heed to that question. I have more faith in the Association of Faculties than they have in themselves. It is very easy for an outsider to have faith in a thing, whereas the people right inside of it have no faith themselves. I do not think it is too much to ask that the Faculties Association insist upon their permission being asked for the formation of dental schools. We do not say that pharmaceutical schools shall ask our permission, but only our own schools, and surely we have a right to do that. I want to call your attention to the fact early enough. The lessons taught by the figures I showed you we should not forget. People ask me if I have not over-estimated the figures, but I assure you I have not done so. It occurred to me that at this meeting we might get better data than I gave last night. I attempted to get the number of persons that constitute your practice. What I mean is, not people who come to have a tooth extracted, but persons who have had work done for them by you, teeth cleaned, a filling or two put in,—never mind if they have afterwards gone to some one else. I think it would be a valuable thing to have.

Dr. Crouse.—May I offer a solution of this problem? That is, not to allow the colleges to charge a fee for the clinical work. They start first with men forming themselves together to make money, and they put out the sign "Dental Infirmary" or "Dental College." So they run on until some individual comes along and buys up their charter and gets some one to lecture. Then, after a year or two, they apply to the Association, and the Association sees no way of shutting them out. In politics or anything else, when the situation gets so bad that the people cannot stand it any longer, the country is aroused and it regulates itself. I have the same faith in the college work. It may be well to look into this question from a business stand-point. It is well known that the infirmaries of colleges are a source of revenue. I have been asked to join one of these institutions, and to help them along with my journal. There are many dentists who do not belong to any society, and who do not associate with anybody. There are many men who call themselves dentists who are really not so. They move from place to place. If this Association could get the different societies to affiliate themselves with it, and if the State societies would get

the good men in the State who do not belong to any society now, they could do good work.

Dr. Jack.—You will not have failed to observe that the purpose of the second paper of last evening was to show the necessity for care in respect to the admission of new schools. In order that a higher level might be reached, the National Association of Dental Examiners, in looking over the subject and in determining what procedures they could take that would assist in bringing out a higher level, formulated the present rules governing their action in the future. It is headed, "A Plan of Requirement for the Recognition of New Dental Schools." I might have stated to you before that we had no definite rules regulating our action. Each dental school which may in future come before the Association for recognition must have a teaching faculty composed as follows,—to wit: At least three professors of dental subjects,—namely, for operative dentistry, for dental prosthetics, and for dental pathology and therapeutics. For medical subjects there must be at least five professors,—for anatomy, physiology, chemistry, pathology, and materia medica. Its students must also be taught the subjects of chemistry and bacteriology in laboratories adapted for the purpose, and under suitable instructors. Such special school must possess, in addition to suitable lecture-rooms, a dental infirmary and rooms suitable for manual training for operative dentistry, and must furnish systematic instruction to its students. All of these provisions are to be determined by the Board of Examiners of the State within which is located the school making application to this Association to be admitted. The purpose of these rules is to restrict the recognition of new schools that are not up to the standard. The result of such action must be to commence a levelling upward of the schools which are below this standard.

Dr. Shepard.—I have been exceedingly pleased with the remarks of Dr. Crouse, and, in my opinion, he has presented the only solution of this question. There is not a dental college in this country but is practically telling falsehoods all the time. I have spoken on this subject before. The impression is given out, if not explicitly stated, that the fees charged in the infirmary are to cover the cost of material. I think I do not overstate it when I say that this is the universal idea which is enunciated or implied by every dental college in the country. It is a downright falsehood, whether expressed or implied. What is the cost of material in putting in oxyphosphate fillings or amalgam fillings? Is it customary to charge a nominal fee—twenty-five cents—

for an oxyphosphate filling and twenty-five cents for an amalgam filling, or is it not the general custom? A college which presents to the public the idea that the services are gratuitous, for the benefit of the public or the education of the student, and which charges as much as five cents for an oxyphosphate or an amalgam filling, overcharges from the cost of the material, and the balance goes to the profit side. I presented some figures showing the different prices charged for gold fillings at the different colleges. One college charged seventy-five cents a sheet for the gold, and this college, to make its infirmary more profitable, served out No. 3 foil instead of No. 4 because it was cheaper. Another institution charged forty cents a sheet for No. 4 foil, which was a fair and honest charge, including wastage. If there is this universal impression given out in regard to the services being free and the charge being for the cost of material, we all know whether that is true or not. If the infirmary is an element of large profit, and I am told that in some colleges the profit from the infirmaries is from ten to fifteen thousand dollars per year, the solution of Dr. Crouse is an admirable one, and will meet the case.

For some years I have been an advocate of an answer to the question why, in the minds of liberally-educated people, particularly physicians and people most familiar with eleemosynary labors, we have not had granted to us the rank we claim, either as a liberal profession or a specialty of medicine. The great reason why that has not been done is that, in the line of thought in connection with medical services, we are not a liberal profession. Where, in this country, can you point to a dental hospital, pure and simple? There is not one. Go over the list of twenty-five thousand dentists, and how many of them are giving up even half a day per week for the service of the poor? You can count them on your fingers. Look at the medical profession and the hospitals. Every town and city of twenty-five thousand inhabitants has its hospital. The services are free; the physicians go there day after day, giving more or less of their valuable time to an effort to benefit and ameliorate the condition of the sick and suffering. When we can hold up our heads and look the medical men in the face and say we are liberal, not with our money, but with what is more valuable, our skilled services, then can we claim to stand on a par with the medical practitioner as a liberal profession, doing our duty under the great, broad principle which overlies and underlies and permeates through all ages,—medical service to people to save them from and to alleviate their suffering.

I intended to write upon this subject. I advocated at the recent Congress to have a committee appointed to report on the care of the teeth of the poor. The report did not amount to much, but it is a vital question for us to take up.—What shall we do for the teeth of the poor? We must consider the question sooner or later, or we shall fail to grow to the stature which we aim for, and which some day we shall arrive at.

Dr. Truman.—There has not been a year since I have been connected with this Association that some one has not assailed the colleges of this country. When a man stands up here and asserts that there is not a college in this country that is not a fraud, I think it is time to stop and consider what we are doing. It is not true of all colleges. I know very well that in the college with which I am connected no such state of things exists, and I believe it to be true of a majority of the colleges. Work for the poor is done at the lowest possible cost price. Men talk about doing work for nothing. I do not know that any man here works entirely for nothing, nor do I think it is good policy as a rule to give a thing without some remuneration. Men come here and make charges against educational institutions that have been for the last forty years building up the profession, and have made it what it is to-day, and it is a disgrace to this body that they listen to it. Talk about treating the poor! I have had over thirty years' experience in this business, and I know it is impossible to get the very poor into the colleges, because they cannot spare the time to come there. Time is money to them, and when you talk of comparing dental schools with medical dispensaries it is absurd. A man can go into a dispensary and have the prescription made out for him in five minutes; in a dental college he must wait three or four hours before he can be served. There is no comparison. I am tired of this thing. I have heard it year after year. I know the colleges are doing their best to elevate the profession.

Dr. Smith.—The colleges *are* doing charity for the poor. The institutions with which I am most familiar have infirmaries to treat the poor. We go to the institutions and pay the bills of those who are operated on in the hospital by the week. I only refer to this to assure you that the colleges are doing charitable work for the poor, and many of the infirmaries are only self-sustaining. Dr. Shepard is mistaken. He does not know what is being done. We pay the bills of the very poor in the hospital, and we take care of the orphans gratuitously, without any charge whatever.

Dr. Walker (of New York).—I did not expect to speak upon

this subject in any way whatever, but after listening to the three papers which were read last night and the discussions following them, I must ask, What have we, as dentists, learned? We have learned that there are some dentists connected with this Association who think we have too many dental colleges, and others who think we have about enough. It has narrowed itself down to this: that there is room for many more dental colleges if they will only place their standard higher. That is all we have gained from this discussion. It has ended in a dispute among members of different colleges, and I move that the discussion be closed.

Discussion closed.

Dr. Guilford read the report of the Section on Nomenclature, with relation to changing certain terms now in use, and calling attention to the proper pronunciation of technical terms. Dr. Molyneaux read a paper on the same subject, and was followed by Dr. A. H. Thompson, who read a paper entitled "A Basis for Dental Nomenclature," of which an abstract follows:

That dental nomenclature is in a barbarous condition is admitted by all. Like all systems of terminology, ours is more or less arbitrary and artificial, and often applied without appropriateness or discrimination. Many names have come down to us, some of which are awkward and insufficient, but must now be accepted because established by usage, and it would be impossible to change them. It is generally conceded that our nomenclature is greatly in need of correction and codification, and the first thing to be considered is a starting-point. To all students of the subject it would seem that this is furnished all ready to our hand by Dr. G. V. Black, in his admirable study and *résumé* of the subject given before the World's Columbian Dental Congress and published in the transactions. This great paper is a landmark in the history of dental nomenclature. Without wasting time as to the desirability of having an established nomenclature, we might as well proceed at once to formulate a code. This can best be done by the American Dental Association, which is the national representative body of the profession in this country. A decision emanating from this body would be held in respect by the profession, and a code of terms of nomenclature would be final. A list of the terms in general use should be submitted this year, known as "The Code of 1895," and lie over for one year, to allow time for discussion and criticism by the profession at large, and then be adopted with whatever corrections may seem desirable. A systematic dental nomenclature should be founded on the zoological system of names

of the teeth of animals employed by naturalists as a basis. Three systems are indispensable,—

1. The gross description of teeth.
2. The detailed descriptions.
3. The minute location of areas on the surface of the teeth.

The matter is merely to be inaugurated at this meeting. The work must be continued from year to year, proceeding slowly in order to give ample time for discussion and suggestion.

DISCUSSION.

Dr. Black.—The importance of the question is such that it merits our closest care and attention. I will not undertake at the present time to speak specially of the words to be employed, but rather of the general subject. In order that we may succeed in adopting a nomenclature as a profession, great care must be exercised. But while the selection of words and rules for the use of words is of great importance, this will not succeed unless there has been a careful, judicious effort made to harmonize different members of the profession and different sections of the profession in the use of this nomenclature. This has been the great difficulty in medicine. Some of the specialties have, but for medicine in general there is practically no accepted nomenclature. If we are to have a nomenclature in dentistry, which would be very desirable, we must arrange ourselves into groups for the study of this subject and for the distribution of the use of this nomenclature. It should be taken up by the Association of Dental Faculties. The use of words that may be adopted in teaching by the members of these Faculties should be enforced, and their recognition of a college should depend upon that. This may sound a little harsh, but if you study the formation of nomenclature in botany and zoölogy, you will find that it is not as harsh as some of the proceedings that have been resorted to in those studies. It is not necessary to wait to complete this work, because a nomenclature in a science that is progressive is never complete. My advice to the dental profession is to organize on this subject and formulate it as far as they can, and require that in the teaching of students this be used. If you will do this, it will be but a few years before the dental profession will have a nomenclature that it can point to with pride, that will lessen by nearly one-half the time required in teaching any individual subject in dentistry. Talk about technical words being cumbersome! There is no vocation followed by any set of men that can succeed without technical words. The plasterer has

his technical words, and their use is as closely followed almost as the use of technical words in botany, and we know that science, on account of the multiplicity of its terms, is most rigid. The boot-black makes a noun out of a verb, and the philologist must bow to him. He says, "Have a shine, sir?"

The time required for the dental student to accomplish certain results would be shortened and his work lessened if we did this thing that has been proposed. These are, in brief, the principal plans of getting at this work. This Association alone cannot do it, but it is properly the starting-point from which the whole should be controlled. It is necessary that it be organized throughout the ramifications in all the colleges of the country. If the colleges will do this, it will not be long before the entire profession will be united upon the subject. Of course, we must have discussions on this word or that word. It should not be done hastily. It requires years of work, and we should go into it with the view of following it up continuously. Even when we have it formed as perfectly as we can, as long as we progress we must continue the work. It has been mentioned that we should attend particularly to the nomenclature in English. Let me say that we cannot attend to this for the English language alone. Whatever we do here to-day is not only for the English language, but for the German and French. What affects these three great languages affects all others. In the selection of roots of words, particularly, we should not only look to their usage in the English language, but to the French and German as well. Take the word "abrasion," for instance. We speak of teeth being abraded when we find them worn by mastication. A French author uses that word for the operation of removing calculus from the teeth, and he has followed the root as closely as we have in English. We want to follow all the changes of meaning in these three languages particularly.

As we follow words we find that they have changed somewhat in their meaning in different languages. Some man should be found who is inclined to work in this direction, and who has the proper education in languages and taste, to take this up as a specialty and be the leader of the committees that are formed on this subject. We may find some dentist who has that peculiar tact and education as well as the inclination necessary to make him successful in following up this subject.

Dr. Stollwag.—In the matter of nomenclature and the use of words in general there has been in the past a dread of the subject, caused by the fact that our dictionaries are so enormously large

now that we all acknowledge that we can never conquer them. I found a little plan, which may not be original, but which has been of such great assistance to me that I adopted it and recommended it in the Philadelphia Dental College to the young men who come there. I find that it seems to have acted quite as well with them as with me. Inasmuch as those words we use are like so many implements, it is not good that we should use them in such a way that their edges become blunt or ragged. We should keep them sharp. We should use each word as it is intended to be used, and not be loose in throwing them together, as a careless dentist might throw his cutting instruments by shaking them together loosely in a drawer, which we all know would affect their edges. The most celebrated authors—men like Carlyle, for instance—were famous for their command of language. I find that they really used comparatively few words. I found that the ordinary duties of life can be explained and carried on with some two or three hundred words. This rather emboldened me to see what I could do with the words that technically belonged either to the dental profession or to the study of physiology. I boiled them down to something less than two hundred roots. I took these two hundred roots of words and gave the word with its ordinarily accepted definition. I found in that way that I could make a scaffold upon which I could hang other words. Thus, for instance, having mastered two roots of any ordinary word, we would very quickly, if we mastered two more, have a combination by which we could manufacture more. Some of the young men came to me and requested that it might be printed, and we now print these two hundred roots, and then, with a blank page opposite the printed page, note can be made of other words as fast as we desire to add to that vocabulary. The consequence is that, with a little book that takes up hardly any room, we can keep ourselves in much better touch and keep our words in much better condition. I would recommend that to those who feel the necessity for it. I recognize my imperfections, but I also recognize that I have plenty of company in that matter. When I read the Queen's English, the Dean's English, and good and bad English, I came to the conclusion that I was in good society.

Dr. Hunt (of Indiana).—I have heard the word which is spelt "nomenclature" pronounced nomen'clature by men upon whom I rely, and I should like to know what shall be the Bible and textbook of the philologist if not the "Century Dictionary," and they give the pronunciation as no'menclature.

Dr. Guilford.—I found that the accent was on the first syllable, which is "no."

Dr. Black.—The latest authority that has acted upon the pronunciation of that word, together with others, is a committee of the American Association for the Advancement of Science; and according to that committee the word should have accents on two syllables,—namely, no'mencla'ture, the accent being on the first and third syllables.

Dr. Weeks (of Minnesota).—The examples given by Dr. Guilford, and the question asked by Dr. Hunt, and the mental accusation of many of us that we frequently mispronounce words that we know how to pronounce, emphasizes the fact that in pronunciation, too, there is room for improvement. When the dental profession adopt a system of nomenclature, as has been suggested, which will be modified and added to year by year, we will be less apt to mispronounce and misapply. I apprehend that there is no one more competent to take up this matter than the American Dental Association, and I was rejoiced when this committee was appointed. I hope the committee will be continued, that this work may go on, and the Association recognize and adopt the work of an honest, earnest committee. Many suggestions have been made this morning; nearly all of them are pertinent to the question. Any gentleman who has taught the primary lessons knows how difficult it is to teach students definitely when you have no definite terms. You teach young men certain terms; at the first dental society they go to, gentlemen who stand as well in the profession as their teachers use the words in an entirely different way, and consequently the young men are muddled up. It seems we are on the right track, and I hope the Association will uphold this committee and further its work.

Dr. Barrett.—I approve of the report very highly. I wish the attention of the profession might be called more distinctly to solecisms that amount to absolute barbarism, such as "sixth-year molars," the "fangs" of teeth, and things of that kind which are extremely offensive in their application. It is the misuse of terms applied to certain portions of the anatomy that makes us the greatest offenders against all philological laws. While we desire to establish a definite rule of pronunciation for all our technical terms, these gross violations of all kinds of proper names should first engage our attention. I desire to call attention to these things, and I hope the committee will more pointedly mark out these wide departures.

Dr. Thompson.—I want to say that the committee must not expect the work to be done at once. As *Dr. Black* has said, it will never be completed. This committee will do the work as best it can, and then hand it on to its successors.

Dr. Marshall moved that the report be accepted and the committee continued; also, that the list presented by the committee be submitted to the profession for criticism and suggestions before final action is taken thereon.

Motion carried.

Dr. Guilford.—*Dr. Stellwagon* spoke of words and compared them with tools, which is a comparatively correct illustration. Words are really tools with which we work. If a mechanic had a nail to drive, and he drove it once with a hammer and another time with a monkey-wrench, we would not think much of him. Yet that is exactly what we have been doing,—using words once to express one thing and again to express something else. This report is made to show what we have done. We want it printed in the transactions, and we want every society to take up the subject and discuss it, and every man to constitute himself a committee of one to hunt up these words for himself and get acquainted with them. Next year, if we have decided upon the proper use of a number of words, let us have that list, and let the teachers in the colleges have those words. As fast as these are adopted let them be taken up by the editors of the dental journals, and if the editors and the teachers will use them we will soon bring about a very acceptable change. I would move that *Dr. Black* be appointed upon that committee in place of *Dr. Stubblefield*.

Motion carried, and subject passed.

Dr. Williams Donnelly then read a paper in which he earnestly urged that the Association consider the opportunity afforded by the National Medical Museum and Library to accumulate, preserve, and exhibit, at government expense, literature and museum specimens to illustrate our history, progress, and attainments, and to evidence, as we can in no other way, our claim as a liberal profession.

Dr. Crouse requested the Association to appoint a committee of five to examine the accounts and workings of the Dental Protective Association, and *Drs. H. H. Smith, L. D. Shepard, H. B. Noble, L. L. Dunbar, and H. W. Morgan* were appointed on such committee.

Section II. was then passed.

Motion made to devote thirty minutes at the special afternoon session for the discussion of Dr. Donnelly's paper.

After the chairman had announced the organization of the various sections, the meeting adjourned until 7.30 this evening.

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE regular meeting of the American Academy of Dental Science was held at Young's Hotel, Boston, February 6, 1895, at six o'clock, President Smith in the chair.

The paper for the evening was by Dr. R. R. Andrews, of Cambridge; subject, "A Contribution to the Study of the Structure of Dentine."

(For Dr. Andrews's paper, see p. 655.)

DISCUSSION.

President Smith.—We have listened to a very interesting paper, and it has certainly been a great pleasure for us all to witness the beautiful slides which have been shown here to-night. The essayist of the evening referred particularly to Professor Bates. Perhaps Professor Bates will open the discussion for us.

Professor Bates.—Dr. Andrews referred to Dr. Rose's work in Germany, speaking of him as one who has done more, perhaps, than anybody else of late years in this histological work. He did not mention the fact that Dr. Rose is a practising dentist, and I might say that the particular line of work in which he has made his investigations is in regard to the evolution of the tooth, and I suppose the work he has done in that line is, perhaps, the best that has been presented to us. He has a theory of his own concerning the evolution of the tooth which, perhaps, contradicts the theories of our American workers in that line. If you have followed the subject at all, you know what our theories of tooth evolution are. Of course the air is full of evolution nowadays. There is scarcely a magazine we pick up but contains something on the subject, and everything, particularly in the field of biology, seems to be based upon evolution, and we hear it everywhere, so that the tooth comes in for its share. Professors Cope, of Philadelphia, and Osborne, of New York, are the men who have done the most in this country bearing on this question of evolution. These gentlemen are both

palaontologists and have approached the subject from the stand-point of the palaontologist.

Dr. Rose has taken the matter up in a different way; he has approached it from the stand-point of the biologist, and in his histological work he has tried to show the different stages through which the original reptilian tooth, which was the progenitor of all teeth, has changed as it has been called upon to do more severe and varied work, so that the six-cuspid mammalian tooth represents six primary cones which have merged together. Now, that theory has been treated by Professors Cope and Osborne in this country, and while they claim that this mammalian has descended from the reptilian tooth, as Dr. Rose does, at the same time they claim that this evolution has come about by the production of additional cusps on the original central reptilian cone. So, then, these are the two theories of tooth evolution which are presented to us to-day, and the great battle is being fought along these lines. The subject which Dr. Andrews has paid particular attention to, the sheath of Neumann, is, like the membrane of Nasmyth, something we really know very little about. I think Dr. Andrews has shown us to-night very clearly the existence of such a tissue, and that we cannot but feel that statements to the contrary are simply what we might expect from those men who have not had advantages equal to those of Dr. Andrews and the workers he has quoted.

President Smith.—Gentlemen, the society always listens with interest to whatever our honorary member, Professor F. W. Putnam, has to say when we have the pleasure of his company at our meetings.

Professor Putnam.—This subject is so entirely out of my line that I do not know just how I can add to the discussion. I wish to say, however, that I have been instructed every moment while listening to Dr. Andrews, and his illustrations have exemplified the truth of a remark I made when I was last with you. I said that I thought it was necessary for a dentist to have a very delicate touch in order to amount to anything in his profession. Perhaps not all of you are familiar with the working of the microscope and the making of such sections as we have seen this evening. I have seen a good deal of that work carried on; and I know that the dissecting out of one of those little cells is an exemplification of my ideas in regard to delicacy of touch. Those of you who have done such work know how extremely careful one must be, how the least unsteadiness will destroy all your work of hours in cutting your section and then picking with a fine needle to clear the little cell

which you wish to show. The sections which have been presented to us to-night must represent hours and hours of work. It is certainly very beautiful work, the making of those sections; and the sections themselves have given to us important information in regard to the formation and structure of the tooth. I have never seen anything surpassing these histological specimens. As to the subject-matter itself, that is entirely out of my line of research.

Dr. Clapp.—I would like to ask Dr. Andrews if he has discovered anything in the structure of dentine, after all the time and work he has spent to get this subject in shape, that would lead to any theory which would be of practical value to us in the treatment of sensitive dentine? Now, in decalcifying these teeth and preparing them for his slides he finds that certain things perform certain functions, and some portion of the tooth conveys sensation, and I would like to know whether, from the data he has collected and from his experience in the treatment of dead teeth, or the teeth that he works on, he has formed any theory which will be of practical benefit to us in our operations or teach us what to use in the cavity of a live tooth to reach the sensitive portions?

Dr. Andrews.—I wish I could answer that question in the affirmative. It opens up a line of thought that is likely to involve a great deal of research before anything like a satisfactory answer can be given. There is no question but that the pulp is affected by the action of acids on the dentine and by other causes, but we do not as yet know in what way. Tomes speaks of a specimen where the nerve-fibre terminations are shown over the large ends of the odontoblasts. It has never been proved that the nerve-fibres enter and go along the fibrils. It would seem as though the sensation is conveyed by the fibril to the pulp, but in what way is still a mystery. There is something singular to me in this fact; that in opening up a cavity in the crown of bicuspid and molars we proceed with the drilling without giving much pain, until we come to the cavity proper—a most intensely sensitive spot—somewhere between the enamel and the pulp. Well, we cut through this and we can then go deeper if need be without much sensation. Now, the question is, Why should the fibrils be so sensitive at that particular point? I have reasoned that it is the action, probably, of the acid on that softened mass, all the fibrils within it are disturbed, but when we cut through that mass we come again to the single fibrils in the normal basis-substance, and the sensation is very much less. That is the only way in which I can get any intelligent explanation of the intense sensitiveness we sometimes meet with in preparing

cavities. Just how sensation is carried to the pulp I do not know, nor do I know just how to certainly obtund it from any observations that I have made.

Dr. Clapp.—In regard to sensitive dentine, I had yesterday an experience that was both interesting and provoking. The patient has complained of pain in the two right superior bicuspids on mastication. I examined the teeth, and with an exceedingly small, sharp-pointed exploring instrument I could just get it into a depression in the second bicuspid. It would not go in more than the one-hundredth part of an inch and it was as fine as a needle, but the sensation was excruciating and caused the tooth to ache for a long time. After putting on the rubber and drying out the tooth, I was enabled to get in just a little way and make a very small cavity, enough to hold a speck of gold. Now, I didn't learn anything from that operation excepting that a very small thing can be exceedingly painful. I think it was the smallest crown cavity I ever saw that was sensitive.

Dr. Andrews.—In that beautiful section of Dr. Gysi's showing the cross section of the sheaths and the same sheath in longitudinal section, all through the structure of the matrix are seen faint processes, which he calls "gelatin-yielding fibres." You remember that I spoke of a fibrous substructure on which the gelatin has been deposited before the calcoglobulin is given off from the odontoblasts. This fibrous substructure was demonstrated three or four years ago by Mummery, of London, and described and illustrated, and these appearances that are seen all through the tissue I have shown are spoken of as gelatin-yielding fibres of the dentine; not the fibrils or their ramifications. And it is a question in my mind if, in what we call the Mummery fibres, upon which this tissue is built, there may not be a trace of gelatin left in their structure. I do not believe there is a living reticulum through the basis-substance of the dentine other than the ramifications and anastomoses of the fibril within the canaliculi.

Dr. Clapp.—Just one word more in regard to sensitive dentine. Of course, if we knew entirely the structure of dentine and all about it, we could perhaps do more than we can now to overcome its sensitiveness, but it seems to me that this sensitiveness is caused by pressure,—not by the act of cutting. I now make it a point in cutting sensitive dentine to have very sharp instruments, so that the pressure in the act of cutting may be as slight as possible.

Dr. Andrews.—This may be a little off the subject, but I would like to ask if any of the members have used glycerin and cocaine,

mixed together, to allay the sensitiveness of teeth. The glycerin has the power of absorbing moisture and the cocaine would act on the fibres. I have tried it and in some cases it works very nicely.

WILLIAM H. POTTER, D.M.D.,

Editor American Academy Dental Science.

THE regular meeting of the American Academy of Dental Science was held at Young's Hotel, Boston, March 6, 1895, at six o'clock, President Smith in the chair.

The paper for the evening was by Dr. Frederick Bradley, of Newport, Rhode Island; subject, "Judgment an Important Factor in the Preservation of Teeth."

(For Dr. Bradley's paper, see page 664.)

DISCUSSION.

Dr. Cooke.—I congratulate the essayist in showing good judgment in writing his paper. If a man has judgment he has something which education will not give him, and which training cannot take away from him. Information and manipulation he may acquire by patient study, but if he has not the attribute which is sometimes called "horse sense," no amount of education will put it into him. Judgment is required in other persons as well as dentists. It seems to me that patients should exercise good judgment when they select their dentist. A certain man who lives out of town once told me that he always had his teeth cared for in the city, as he didn't have much faith in the dentist in his town. But as the local dentist was convenient he could send his children there very easily. I could not help thinking that possibly this convenience might be a cause for regret when the children grew up. Much more depends upon the care of young teeth than upon after-treatment. Parents, when they come with their children, should exercise proper judgment, and bring them at a reasonable time, and also insist on proper treatment when they do come. In some cases you cannot do much for the children, especially if they have not been trained to behave when they are at home. Some of them have been petted and allowed to have their own way, and they won't mind you any better than they do those at home, and when you get one of those hard cases the best that can be done is to carry out Dr. Stebbins's idea of taking off the rough edges of their cavities and wiping them out with nitrate of silver.

In regard to adult patients, it seems to me they should have good judgment in yielding certain points, and in their appreciation of what has been done. They come to us and there are certain things to be done: their mouths are in a very bad condition from neglect, and it takes considerable time and skill to get them into shape again, and if your charges are high very likely they go to somebody else, who reaps the benefit of the good work you have been doing for them. There is neither judgment nor justice in such cases.

In the selection of our methods, materials, and instruments, we should be very careful to get the combined judgment of the profession on any one thing before we adopt it. When amalgam first came into use it was supposed to serve the purpose just as well as gold, and was much easier to put in. Then came the reaction, and for a while it was not used at all. We had the same experience with crown-work and in the use of gold; because one piece of gold would stick to another, many tried to build up monuments on any part of a tooth. But they soon found that a structure was no stronger than its foundation, and the result was a reaction in the use of cohesive gold. Plastic fillings and bridge-work have been through the same routine, and so has copper amalgam. Our experience in all these things proves that it is best to go slow in accepting a thing merely because somebody claims to have had good success with it; the favorable experience may have been a matter of chance. When you get the combined judgment of all, then it is safe to use a preparation or method.

One of the things which greatly tries us is the number of failures that are made in orthodontia. I know of two cases where the patients have been induced to allow the extraction of two teeth,—in one case they were the bicuspid, and in the other case the bicuspid and the first molar,—and in both cases a result was produced by which the patient was handicapped for life. It seems to me in a position of this kind a man shows very poor judgment in trying to settle everything for himself. There is no need of it where we have such friendly associations that a man can very easily obtain *sub rosa* information,—if you wish to call it that,—and the patient need not know that you have consulted anybody. We have to be very careful about consultation, for if we call another dentist in consultation the consulting dentist may get the patient, and that ends the case so far as we are concerned.

I think we see about as bad failures and evidences of misplaced confidence in the matter of bridge-work as in any line of dentistry.

I remember seeing an extensive bridge which was put in by some advertisers in New York or New Haven, and it failed. Of course the patient felt very badly about it, after spending money and time on it and supposing that it was going to last a lifetime. When putting in any extensive bridge-work I have been in the habit of telling the patient that the appliance will last a certain length of time, but that eventually it will be necessary to have a plate. The bridge is simply a convenience which will put off the necessity of wearing a plate as long as possible. I saw a case where a man extracted two laterals and two centrals, more or less decayed, so that he could put in a nice bridge, running from cuspid to cuspid. You would expect that a man who had the courage to attempt such a thing as that would have the manipulative ability to do the work decently and to make an appliance that could be worn with a minimum amount of discomfort by the patient. This was a miserable failure.

There is one point which the essayist touched on with regard to the education of the dentist which I think is very important. I refer to his remarks on the necessity of trying to bring the student to think for himself. It seems to me that is one thing we have left out in our school instruction. The student may be able to answer the questions in his text-books, he may be able to manipulate well, but if he does not know just why he does a thing, the instruction he gets is not of much practical benefit when a complicated case is met.

Another place for the exercise of judgment is in the length of operations. Where patients have been subjected, as they have been in the past, to operations extending over three, four, or five hours, it is a hard strain on the mind, and brings the patient into an attitude towards the dentist that is anything but pleasant, and they remain away so long that the good result which you may have accomplished is destroyed.

It seems to me that long operations have done a great deal of harm to us as a profession, and I think that the day has gone by when a dentist should attempt a large amount of work at one sitting.

Dr. Potter.—In the use of good judgment in dental operations much depends on a thorough knowledge of the conditions under which we operate and the purposes for which we operate. We must understand the medical side of our case first of all, and then the mechanical side.

If we have this perfect knowledge we are not likely to go off in

an erratic course. If we see a demonstration of a certain method, like that, for instance, which was given by Dr. Libby a short time ago with regard to burnishing gold, we do not necessarily either adopt it completely or reject it, but we are more likely to find it useful in certain parts of our work and yet not serviceable in others. I can imagine that if that demonstration was given to students, many of them would at once decide that it was either good for nothing or that it was the only way out of a difficult piece of work. The proper effect which any unusual method of practice is likely to have upon a well-educated mind is to afford certain suggestions; it will not revolutionize our work, but will help us to do it better.

Dr. C. H. Taft.—I do not understand the purport of Dr. Bradley's paper to be either that of commending or of condemning any special way of practising dentistry. A very great deal has been said in the past against copper amalgam, and in so far as it has a bearing upon the subject of the saving of teeth, I would like to take exceptions to some statements that have been made. You all know what my views are in regard to the use of amalgams. It is rarely ever that I use amalgam when I can substitute anything else as well. It seems to me that our profession shows a lack of good judgment, if we are going to use amalgam at all, in the wholesale manner in which silver alloys are used to-day and have been in the past.

I am very sure that where I have had occasion to take out one copper amalgam filling I have had to take out or patch up twenty-five of so-called silver fillings. Since I have been away for the last two years I have not seen many of my copper amalgam fillings, but in the previous years of my practice I had the best of results with copper amalgam as a preserver of tooth-substance. I have, however, quite recently seen some of my copper amalgam fillings in the mouths of three of my patients that were inserted four or five years ago. There is absolutely no shrinkage whatever, and the teeth are in a perfect state of preservation. If we are to show good judgment in any particular way in our efforts to save teeth, and if we must save them with amalgam, I cannot for the life of me see what the objection is to copper amalgam, and I wish the gentlemen who do oppose it so strenuously would tell me wherein I fail to get satisfactory results. I certainly have had the very best results with it, and I should not be ashamed to have any of the gentlemen of this society, or of any other, see the fillings that I have inserted, and let them judge for themselves whether or no these fillings are preserving the teeth, whether there is any shrinkage or leakage.

and whether they have not just as smooth a finish as any of the gold fillings that I have ever inserted. With my own experience in mind, I have always endeavored to find out wherein copper amalgam fails in the hands of so many men, and why, it is that they are so constantly casting slurs upon it. I am not speaking now of what may be its injurious effects upon the general system, but rather of its utility as a filling-material.

Dr. Williams.—There is a point in regard to the fact last alluded to by Dr. Taft which would seem to indicate that proper judgment in operating would contraindicate the use of copper amalgam in the interior of a cavity in a tooth. The greatest density of a tooth, of course, is the enamel, and it would be perfectly proper to make a hard, flinty surface for grinding purposes; but to make a hard filling for the interior of the tooth, in my observation, has often proved to be destructive to the vitality of the tooth. My theory is that we should have something for the interior of the cavity that corresponds somewhat,—certainly not harder than the dentine at that part of the cavity. There is also a mistake which is very commonly made,—that is, in filling up those cavities with phosphate cements, which in a short time become very hard and rocky, no elasticity, no porosity, no free play for the natural pulsations in the circulation of the pulps, and they rebel after a while; and frequently I have found pulps destroyed from that very cause, from having too hard material in their vicinity.

Dr. Cooke.—I will try to answer Dr. Taft's question in regard to copper amalgam. I used quite a good deal of it at one time, and for a while was strongly in favor of it, but I soon began to notice that people who had copper amalgam fillings had very sensitive teeth, and, later, I found cases where decay occurred around the copper amalgam at the cervical margin. The fillings were dished out so that you could put your instrument in between the wall of the cavity and the filling. This seems to be the testimony of nearly every one who has used copper amalgam, and Dr. Taft must have had a very peculiar experience to be so in favor of it. I have inquired at the dental depots regarding the sale of copper amalgam, and they say that where they used to sell a great deal of it the sale now is very small. I admit that I have had some cases in which the conditions seemed favorable to its use, and it appeared to preserve the tooth in a remarkable degree. I should think if Dr. Taft, holding the views that he does, desired to use any amalgam, he would prefer one of the old kinds that does not wear. How he can use copper amalgam, when there is such an evaporation of

mercury from the surface all the time, I cannot understand. I should think he would be afraid that it would poison his patient.

Dr. Taft.—My experience has been just the opposite of Dr. Cooke's. I have used copper amalgam in places where the conditions seemed most trying, perhaps on the buccal surfaces of molars and bicuspid, and in cases where the teeth were affected with white decay, and in no case that I can remember has it been necessary to do any subsequent patching about the margins of the fillings. I have been surprised in taking out copper amalgam fillings where two-thirds of the tooth, perhaps, consisted of amalgam, and where, in preparing the cavities, there had been absolutely no undercuts or retaining-points made, to see how those fillings have remained in place where no amount of force employed in the process of mastication had caused them to break away or to come out. I wish those gentlemen of the profession who are continually objecting to copper amalgam could look into the mouths of some of my patients and see the fillings that I put in several years ago. It would be the best answer in the world to these arguments that are being urged against this agent, and is, to me, good evidence that I preserved the teeth of my patients successfully with copper amalgam before I had practically discarded the employment of any sort of an amalgam as a filling-material.

Dr. Werner.—You don't use it now?

Dr. Taft.—Not when I can serve my purpose with something else.

Dr. Andrews.—How about its washing out?

Dr. Taft.—That is a thing I wanted to speak of. I have seen copper amalgam fillings that have dissolved possibly just as much as a gutta-percha or a cement filling would; or, to be more accurate, not exactly dissolve, but, rather, in course of a few months, become cup-shaped; and I believe that the cause of that is the leaving in of too much mercury. You will find that when you first mix up the amalgam it makes a glistening mass that is exceedingly moist. It is my habit to place it in a piece of chamois-skin or a napkin and squeeze out all the mercury possible. In reheating, you will express still more mercury, and after further continued heatings you will get very little out of it. When that amalgam is placed in a tooth you will have the densest kind of a filling possible, and one which will become as hard as steel. I believe if you do not squeeze out all of the mercury, then you are likely to get fillings which will possibly become cup-shaped in the course of a few months, though they do not draw away from the walls of the cavity as Dr. Cooke describes.

I have also noticed that if the filling is inserted immediately after the first heating it will set very quickly, but after two or three heatings it will take half or three-quarters of a day before it sets. By taking your copper amalgam, heating and grinding it up thoroughly in a Wedgewood mortar, and manipulating it in the way I have described, you will have obtained a filling that you need not be afraid is either likely to disintegrate or fail under any condition whatever to stand the test of time.

Dr. Andrews.—There is one authority on copper amalgam fillings who says that he uses the amalgam just as it is. If he uses it just as it mixes, without squeezing out any mercury, he always has success, and if he presses out the mercury he always has failure. It merely shows the difference of opinion among different operators.

Dr. Daly.—There is one thing I have noticed about copper amalgam fillings,—those that stay entirely black are permanent ones, and those which have a polished, glistening surface are the ones that dish out. I don't know whether the black ones contain the least mercury or not.

I would like a dental definition of the word "permanent" from some of the members present. There seems to be a difference in the meaning of this word as used by different people. Some seem to imply that a gold filling is the only permanent filling, while it is claimed by others that cement is permanent because it lasts up to a certain period, and then must be renewed with another cement filling, which is permanent for another period. The term is also used in speaking of bridge-work. The essayist spoke of putting a full denture on four teeth. I know of a case which was placed on in that way that lasted for fifteen years, and in the judgment of the operator putting them on in that manner they were "permanent." The teeth supporting the bridge were destined to have been lost at the end of fifteen years with or without a bridge (for if not by a bridge they would have been destroyed by a plate), and if the bridge was made to do service during the life of the supporting teeth, then it was a permanent denture. It was all that lay in the power of the dentist to do, and its chief value was in the fact that the patient was saved from the disagreeable features of a plate for a considerable length of time.

Dr. Werner.—Another objection to the copper amalgam is the discoloration. I am one of the fortunate ones that never used it. I have found no need of it in my practice, and a decided disinclination on the part of my patients to have copper amalgam or any amalgam put into their teeth.

If it were not for this constant lack of judgment medicine would be nearer an exact science, and dentistry would be still nearer an exact surgical and mechanical science. Is the man living that has the exact judgment and foresight to tell what is going to be the very best thing to be done in every instance? It is not possible; it is simply possible to come near it in the majority of cases. The one who puts in temporary fillings in places where he knows they will have to be soon replaced, does he use good judgment from the financial stand-point of his patients and from a scientific stand-point of his professional calling? I think he lacks good judgment, lacks skill, perhaps, and to a degree abuses the confidence the patient places in him. Many bicuspid are sacrificed every year, and in the course of three or four years the operator can see that judgment was lacking when he cut those bicuspid off. And what was the factor that induced him to do this? Perhaps lack of skill to put in a contour gold filling, or perhaps he allowed his patients to grow up with an absolute horror of an hour or an hour and a half's sitting. Too many patients have decided ideas that a dental operation must be exceedingly short, gentle, and easy, and many operators try to please them too much in that respect. That is not only bad judgment, but dishonesty to patients and a lowering of professional morals. As Dr. Cooke said, I do not believe in requiring your patient to stay in the chair for five hours,—that is much too long.

I remember a distinct case of a boy, whose deciduous molars were decayed, where I was obliged to fill cavities with cement, because his step-mother decidedly instructed the nurse who brought him that no gold should be put in his teeth. Now, those simple cavities could have been filled with gold, without the use of the rubber dam, in the same length of time that it required to put in the cement, and the fillings would have lasted until he was nine or ten years old, but the cement fillings will all need replacing before he loses the deciduous teeth. The essayist has covered almost the whole field of dentistry in the word "judgment." I am glad that our calling has enough of the surgical and the mechanical character to make nearly all our operations a success. Happily, we do not have to rely upon the uncertain action of any drug, either in large doses or in the one-hundredth or one-thousandth part of a drop. We apply surgery and mechanical art, which comes nearer to being exact than any other treatment in the medical profession.

I remember one evening I went home from a meeting of dentists with a brother member. On the way he was speaking of the

virtues of copper amalgam. When we reached the corner of the street where we parted I informed him that I never used copper amalgam. He was perfectly surprised; he did not see how I could get along without it; he had saved more teeth with it than with anything he ever used. Now, his love for copper amalgam was brought about from his lack of skill in using gold, for little or no skill is required in using amalgam or the plastics. You must have a good degree of skill, a certain amount of common sense, good judgment, and a standard for honesty to do the best for our patients. You must be on the conservative side, yet at the same time listen to the enthusiast. It is the enthusiast who has brought our calling to what it is: in the skill of operating, the inventions of instruments, the ingenious devices such as bridge-work,—and who doubts the value of bridge-work? I have a distinct case in my practice where on four teeth, two upper molars and two cuspids, an entire upper denture is supported with the utmost comfort. Nothing could be more beautiful, more cleanly, more satisfactory, than this device to assist in mastication of food and in the restoring of personal comfort and appearance.

The one who simply puts in fillings, and never thinks of talking to his patients about cleanliness and the use of the brush, does not use good judgment. In addition to the cleanliness required to prevent the decay of the teeth, the gum needs the massage treatment of the tooth-brush to promote its health.

There are many other places where the dentist shows a lack of judgment,—for instance, in not restoring to full contour approximal surfaces. We see many cases of separation,—spaces left between the teeth or flat fillings that allow food to crowd in, producing uncleanliness, inflammation, and discomfort, and, in three or four years, redeccay of the teeth. Such want of skill and judgment is what has put gold operations in disrepute. A properly shaped and contoured gold filling will secure exosmosis, suction, the cleansing produced by deglutition, talking, etc., and will be of immense value in keeping the teeth clean and free from further decay. Many operators have failed because they did not know the value of full contour-work, and it is from these failures that we should learn.

Dr. Daly.—And then the question arises, Is your second judgment, after the first failure, any more successful than your first judgment, before failure? That, of course, remains to be proved.

I did not quite see the consistency in Dr. Werner's saying, in the first part of his remarks, that he did not believe in allowing patients to grow up with the idea that dental operations should be easy,

gentle, and short, and then stating that he did allow a patient to influence him to make the insertion of a filling easy and short. The most influential suggestions that we receive are from our patients themselves.

What gentleman present would not rather put a gold filling in a first bicuspid, a large part of which is decayed, than an amalgam filling which the patient demands? Such fillings have not always been successful, but the patient does not usually tell the history of the filling when she goes to another dentist and presents some work that has failed. Does she say that she was the biasing element that influenced the dentist to do the work the way he did? Oh, no; she never says anything about that part of it, and so the dentist gets the blame for the failure, while the patient was at fault. Many people jump at the conclusion that Jones, Smith, or Brown has poor judgment, because they have seen a piece of work that has failed, when really the patient has been the one at fault. The mass of dentists suffer not a little from this misunderstanding of the facts in any given case. The dentist who has a particularly intelligent clientele, of course, does not suffer so much.

Dr. Werner.—It was not a lack of judgment on my part that made the case I mentioned a source of regret to me, but a positive lack of judgment on the part of the boy's mother. It would not have hurt the boy more to put in the gold fillings; it would not have taken longer, as they were the simplest crown cavities, and had they been filled with gold there would have been no necessity for further work until the teeth were lost.

I have an admirable case that will cover the matter that Dr. Cooke spoke of,—two daughters in a family that I treated. They came to me with the shabbiest kind of dentistry. Their teeth were extremely sensitive, and they were on the brink of artificial crowns and dentures. I treated them extensively, and did the best I could for them. I wish now that I had only done one-quarter as much, for when I came to render my bill, amounting to several hundred dollars, the father was astonished and indignant, and said they had been with the previous dentist for years, and he had never charged more than fifteen dollars for one series of sittings. I had done the difficult work necessary to put their teeth in order, to save them for ten or fifteen years. The next operator will get the benefit and credit of my work, in a measure at least, and I get the blame for being unreasonably high in my charges. Now, there is a case where you might charge lack of judgment. Perhaps I was a little too enthusiastic, too conscientious in my work, yet my very best judg-

ment told me to do all that was necessary for the preservation of the teeth; but, in the light of after-events, I would probably not have lost the patients had I done but one-third as much. Use your best judgment in each individual case, study it from all its stand-points, and do the best you can under the circumstances.

President Smith.—In the last case that Dr. Werner spoke of I think he showed good professional judgment, but a lack of business judgment. What he ought to have done in that case was to have called the father of the family to his office, told him what ought to be done, and about what it would cost; but in going ahead and doing a great deal of work to put those mouths in order, without knowing whether the fee charged would be satisfactory, he showed a lack of business judgment.

I think it is the experience of many of us that, if a patient comes from a brother dentist presenting some case which gives evidence of a lack of judgment in its treatment, and the patient makes no explanation whatever, the dentist who receives that patient feels astonished that Dr. — should do so and so. As Dr. Daly has put it, we do not know the circumstances, and should be very careful about offering any criticism. Many of us have patients in society who are up all night and sleep most of the day. They are nervous, irritable, under the care of the doctor, and constantly taking drugs. Yet their teeth must be saved. They are sensitive all over; their nervous system is entirely demoralized, and they are totally unfit to withstand any dental operation. I had a patient in my chair to-day who is a typical example of this class of persons, and if I could charge enough to drive her out of my office I would do so; but she has never found fault with my bills, so I have to do the work, though it is exceedingly trying on my own nerves to do it. If the teeth were of good texture I could separate the molars and bicuspid and put in contour fillings, and they would last during her lifetime. But all I can do with this patient is simply to excavate decay, and, on account of the sensitiveness of the dentine and the nervousness of the patient, it is a most difficult task with the sharpest burs, with all the obtundents and greatest care, and I am obliged to spend two hours where I should spend one. Now, in that case I have put in gutta-percha fillings, and in some cases built those teeth right together solid, and they have been kept along for years in that way. Who can do better under such circumstances? Could better judgment be shown in the treatment of those teeth? I have had patients who, after a long struggle, have finally made up their minds to submit to an operation of two and one-half hours and have a

contour gold filling put in; then, after that, there would be a collapse, a reaction, and the question confronts us, Is it good judgment to put those patients through such a course as that? Have we any right to ask our patients to undergo treatment that disturbs their vitality for the sake of the preservation of their teeth with gold? We must govern our judgment by the patients and the conditions which we meet.

I was amused as well as instructed in reading an article by Dr. Perry in the last INTERNATIONAL DENTAL JOURNAL. He spoke of seeing a large gold filling in a bicuspid that was somewhat top-heavy with its gold. He said that filling, put in in such a way on such a tooth, could not last more than two years, or three at the most, and then he says, "How much better judgment it would have been to put in a cement filling;" and this is the part that amused me, because the title of his paper was "Moderation in Practice and in Statement." How much better judgment it would have been to have put in a cement filling, which would only have taken ten minutes, and could be replaced whenever necessary at an expenditure of five minutes more. If Dr. Perry can properly excavate, dry, and put in a cement filling in ten minutes, he can do much better than I can.

Regarding the matter which the essayist referred to, and which has been touched upon by Dr. Daly, about the suggestions of patients, I think we *are* governed somewhat by the suggestions of patients, but at the same time I think there should be a limit to it. Now, I have heard men make the statement that they would not listen to any dictation from their patients,—if the patient did not think that what they proposed to do for them was just what they wanted done, then they could go somewhere else. I think that is a radical statement, because if you have patients who are treated by homeopathic physicians, and from those physicians receive the idea and thoroughly believe that an amalgam filling is injurious, it is absurd for a dentist to insist on either putting amalgam into their teeth or nothing at all. He can preserve teeth temporarily with gutta-percha or cement, and if they have to be repaired every three or four months, that is their lookout. You can tell them that amalgam is the very best thing you can use under the circumstances, and if they say, "I object to amalgam on account of its being injurious," you have no need to endorse that judgment, but go ahead and use the material which will best serve the purpose, amalgam excluded. I think it is perfectly proper to waive your point under such circumstances as those, but when it comes to

a case of a woman demanding that an entire gold crown be put on a first bicuspid, with a diamond set in, as I have seen done, then I say it is time for the dentist to stand on his dignity and say, "I will not do it," and let that patient go if she chooses. There is a case in my practice that is a good illustration of what may result from accepting of suggestions from patients. A lady went to a certain dentist in this city, and in the course of his work he found that the pulp in one of her teeth was dead, and he decided to remove it. As he was drilling into the pulp-chamber the patient stopped him and said, "Here, I know a friend who had a tooth ruined by having it drilled into." The patient was of a good family and very positive in her opinions, and so the dentist listened to her arguments and temporized with the tooth. He knew better, because he is a good dentist, but still he did not want to offend the patient by insisting on doing what he knew to be right. He had not removed the pulp from the pulp-chamber when he was told to stop, and he gave the tooth the best treatment he could under the circumstances and closed the cavity. As might be expected, an abscess formed, and this he attempted to treat by the use of anti-septic washes, but of course as long as the foul pulp remained he could not obtain a cure, and the matter was carried along this way for a year, and she never would permit him to go into the roots, because she knew it was wrong. Finally the patient came to me with this tooth. As I took out the dressing she asked me if there was any reason why a cure could not be effected, and I replied that I could see no reason, and went to work to do just what he had tried to do. She put a stop to my doing it, saying she didn't propose to have anything of that kind done to her tooth. I immediately arose in all the splendor of my dignity, and said that I should either treat that tooth as I wanted to do or she could go somewhere else. So shocked was she at being spoken to in such a manner that she absolutely cried like a baby in my chair. The sight of the tears made me feel repentant, and I began to explain the case to her, and drew a diagram to illustrate. She allowed me to treat that tooth, and it was cured. She told me when she first came who had treated her, and when I looked at the tooth I was thunder-struck to find that man's name coupled with the treatment of this tooth. I said nothing, however, and when we came to the discussion as to whether I should drill into the tooth or not, the lady said, "That's just what Dr. — wanted to do," and I then saw through the whole matter at once. He knew what ought to have been done, and he did as well as he could under the limitations

placed upon him, and the only mistake he made was in not insisting on doing what he knew to be right or nothing at all. The lady and some others of her family have become regular patients of mine, and he has lost them simply because he did not stand up and resolutely say, "I must treat the tooth in the proper way or not at all." If no one else has any remarks to make I will ask Dr. Bradley if he has anything to say before closing the discussion.

Dr. Bradley.—I think the remarks generally agree with the opinions expressed in the paper. The point brought out by our President and Dr. Daly I think I emphasized quite markedly, and it may do no harm to repeat what I said in my paper, that there are cases where it seems to me it is proper to accept suggestions from the patients, and in other cases it is perfectly legitimate to use your own judgment, and do what in your opinion the case demands, even though it is not just as the patient suggests. In regard to copper amalgam, for those who are satisfied with the results obtained in their practice, I should say it was good judgment to use it; I have used it a very little myself. I will say that I do not use it now, as I like the appearance of other amalgams better, and find them fully as satisfactory,—rather more satisfactory in results than copper amalgam.

There is one point I did not mention. In our attempts to preserve bicuspid teeth in approximal cavities, if we have any reason to hesitate about putting in what we have spoken of as a "permanent" filling (by which term is more often meant a metal filling), I think a very good way is to use gutta-percha, perhaps half-way from the cervical wall, and then make a cement filling to the crown. That is my judgment of how to treat those cases where circumstances are not in favor of a metallic filling.

Dr. Stevens.—I would like to ask Dr. Bradley why his judgment leads him to do that?

Dr. Bradley.—My experience leads me to think that the cement is not so satisfactory at the cervical wall,—that it dissolves, or, for some reason, leaves the wall unprotected. The gutta-percha does not dissolve; it seems better adapted for the protection of the cervical wall, and yet for the crown it has not the wearing properties that the cement has, and I have had very successful results from filling those approximal cavities half-way up with gutta-percha, and then filling the crown with the best cement I can find.

WILLIAM H. POTTER, D.M.D.,
Editor American Academy of Dental Science.

ODONTOLOGICAL SOCIETY OF PENNSYLVANIA.

THE regular meeting of this Society was held September 14, 1895. At the close of routine business the paper of the evening was read by Dr. C. N. Peirce, entitled "What has been done by the Profession in France on *Pyorrhœa Alveolaris*?"

(For Dr. Peirce's paper, see page 660.)

Dr. Brubaker was called upon by the President, who responded as follows:

It will have been noticed in the abstract of Professor Magitot's paper, as read by Professor Peirce, that *pyorrhœa alveolaris* has been observed in the diabetic, the albuminuric, as well as in the arthrotic or gouty patients. The occurrence of *pyorrhœa* in diseases which are apparently so widely separated as these three would seem to militate against the view that the disease in question was simply a gouty manifestation. If, however, the gouty diathesis be received in its totality, it will be observed that very frequently both glycosuria and albuminuria are but two more of its various manifestations.

In many cases of incomplete gout the excretion of sugar by the kidneys alternates with deposits of uric acid, and as the production of sugar is supposed to be a function of the liver, the inference is that this disturbance of function is dependent upon uratic deposits in the liver. With the elimination of large quantities of water under such circumstances the uratic salts are excreted, after which the gouty symptoms subside. If a patient with this temporary glycosuria had at the same time *pyorrhœa*, it might, at first glance, be supposed that the former was the cause of the latter, rather than that they were both symptoms of one systemic condition.

The same holds true with reference to the transient form of albuminuria. Traces of albumen are exceedingly common in the gouty condition, and are supposed to be due to the involvement of the kidney, and more particularly the excreting epithelium from the excess of uric acid. Here, again, the two conditions, albuminuria and *pyorrhœa*, do not necessarily stand in the relation of cause and effect, but as simultaneous expressions of a common diathesis.

Dr. Head.—The treatment by a silk seton, as suggested by De Serran, seems most valuable, and should be given a fair trial. The difficulty of healing the pockets is increased by the presence of pus at the bottom, and if the pus should be allowed to escape it is

reasonable to suppose that the granulation would be much more effective and rapid.

Dr. Peirce.—I was in hopes that Dr. York would be here this evening. He has a very interesting case that has been under his care, which I have seen three or four times,—a lady whose teeth were very loose and the gums very much absorbed. Some four or five months ago, while consulting with him, I suggested to her that she use considerable friction with her finger on the gums every day, rubbing them freely around where the parts had been so much destroyed. At her last visit she assured me she had done this vigorously, and the change was remarkable. I have constantly taken the ground that we cannot produce tissue that has been once absorbed, but the gum tissue in that patient's mouth was normal, probably induced by the friction of her finger. Certainly the remedies applied would not have acted so, but the friction which she gave them undoubtedly brought about the development of a normal quantity of good, firm tissue.

JOSEPH HEAD, M.D., D.D.S.,
Editor Odontological Society.

NATIONAL ASSOCIATION OF DENTAL FACULTIES.¹

THE Twelfth Annual Meeting of the National Association of Dental Faculties was held at the Ocean Hotel, Asbury Park, N. J., commencing Saturday, August 2, 1895, the President, Dr. Frank Abbott, in the chair. The entire membership of the Association was represented at this meeting, as follows:

University of California, Dental Department.—L. L. Dunbar.
University of Denver, Dental Department.—R. B. Weiser.
Columbia University, Dental Department.—J. Hall Lewis.
National University, Dental Department.—J. Roland Walton.
Southern Medical College, Dental Department.—Frank Holland.
American College of Dental Surgery.—Louis Ottofy.
Chicago College of Dental Surgery.—Truman W. Brophy.
Northwestern College of Dental Surgery.—J. A. Whipple.
Northwestern University Dental School.—George H. Cushing.

¹ EXPLANATION.—For some reason, not as yet clearly explained, this journal failed to receive this report in time for publication in the September or the October number. It is generally understood, we believe, that the reports of this Association must come from those properly authorized to make them.—[ED.]

Indiana Dental College.—George Edwin Hunt.

University of Iowa, Dental Department.—A. O. Hunt.

Louisville College of Dentistry.—Francis Peabody.

Baltimore College of Dental Surgery.—M. W. Foster.

University of Maryland, Dental Department.—F. J. S. Gorgas.

Boston Dental College.—J. A. Follett.

Harvard University, Dental Department.—Thomas Fillebrown.

Dental College of the University of Michigan.—J. Taft.

Detroit College of Medicine, Dental Department.—G. S. Shattuck.

University of Minnesota, College of Dentistry.—Thos. E. Weeks.

Kansas City Dental College.—J. D. Patterson.

Western Dental College.—D. J. McMillen.

Missouri Dental College.—A. H. Fuller.

University of Buffalo, Dental Department.—W. C. Barrett.

New York College of Dentistry.—Frank Abbott.

Ohio College of Dental Surgery.—H. A. Smith.

Western Reserve University, Dental Department.—H. L. Ambler.

Pennsylvania College of Dental Surgery.—C. N. Peirce.

Philadelphia Dental College.—S. H. Guilford.

University of Pennsylvania, Dental Department.—James Truman.

McHARRY Medical School of Central Tennessee College, Dental Department.—G. W. Hubbard.

University of Tennessee, Dental Department.—J. P. Gray.

Vanderbilt University, Dental Department.—Henry W. Morgan.

Royal College of Dental Surgeons of Ontario.—J. B. Willmott.

The following colleges were admitted to membership:

University College of Medicine, Dental Department, Richmond, Va.

—L. M. Cowardin.

Atlanta Dental College.—Wm. Crenshaw.

Birmingham Dental College.—T. M. Allen.

Cincinnati College of Dental Surgery.—G. S. Junkerman.

Cleveland University of Medicine and Surgery, Dental Department.

—S. B. Dewey.

The following, laid over under the rules from last year, were adopted as here given:

Resolved, That in view of the recommendation of the Executive Committee that this Association, now in session, shall require that all colleges, members of this Association, shall extend the term of the session of 1896-97, and of succeeding sessions, to not less than six months each;

Beginning with the session of 1895-96, no college shall be permitted to retain membership in this Association if it is conducted or managed, in whole or in part, by any person or persons who do not practise dentistry in accordance

with well-recognized and generally accepted forms, generally known as dental ethics, or if they are owned in whole or in part by men or women who are engaged in disreputable dental practice, or if any college have upon its list of trustees, the faculty, demonstrators, or in any other capacity, any one who does not practise dentistry in accordance with the principles above mentioned. This shall refer to dentists only.

Beginning with the session of 1896-97, the examinations conducted by the colleges of this Association shall be in the English language only.

The other resolutions which came over from last year for action were laid on the table.

A resolution was adopted requiring each college holding membership in the Association to file with the secretary, sixty days before the next meeting, a detailed statement of its equipment and facilities for teaching; all new applicants to file a similar statement with their applications. The secretary was instructed to have blank forms printed for the purpose and forwarded to the various schools.

The report of the special Committee on Preliminary Examinations was received and the committee discharged.

The following resolutions were adopted:

Resolved, That students in attendance at colleges of this Association are required to obey the laws regulating the practice of dentistry in the various States, and failing to do this, shall not again be received into any of the colleges of this Association.

Resolved, That when a college of this Association has increased the cost of tuition fees, no student shall be received at the former fee except those who have matriculated at such college prior to such action.

The Committee on Text-Books reported in favor of the adoption as text-books by the colleges of the Association of two works,—namely, "Dental Anatomy," by G. V. Black, M.D., D.D.S., and "Methods of filling Teeth," by Rodrigues Ottolengui, M.D.S. The report was adopted.

The following lie over until next year:

Amendment to the rules offered by the Executive Committee:

That each college be allowed two delegates, and be limited to one vote for each school.

By Dr. Peabody:

That when a student who has matriculated within the time limit in any recognized college shall, from sickness, death or sickness in family, lack of funds, or other reasonable cause, be compelled to retire from that college before the expiration of the term, he may be allowed to make up the deficit of time in the same or any other college (provided he enter at a date not later than that

on which he retired), be examined by the last college entered, and, if the examination be up to the requirements of that college, and otherwise satisfactory, may be given tickets for advanced standing or graduated, as the case may be.

By Dr. George Edwin Hunt :

Amend the last portion of Rule 3 to read as follows :

Except on such conditions as would have been imposed in the original school, and these to be ascertained by conference with the school from whence he came.

By Dr. Gray :

Moved that when students from one college apply for advanced standing to any other college of this Association, it shall be the duty of the dean or secretary of the latter college to ascertain by correspondence, with the college from which the student comes, if there be any objection to his acceptance.

By Dr. Gray :

Resolved, That all colleges of this Association shall charge not less than one hundred dollars tuition each session.

By Dr. A. O. Hunt :

Resolved, That a student who is suspended or expelled for cause from any college of this Association shall not be received by any other college during that current session.

In case the action of the first college is expulsion, the student shall not be given credit at any time for the course from which he was expelled.

Any college suspending any student shall at once notify all other members of this Association of its action.

The following resolution, offered by Dr. Ottofy, was adopted :

Resolved, That the endorsement of applications for membership, made during the coming year, shall be based upon definite knowledge obtained by a careful examination of the methods of teaching, the equipment, and the efficiency of the faculty.

The report of the Committee on Revision of the Constitution, Laws, and Codified Rules was considered, section by section, and laid over for final action next year; and the committee, consisting of Drs. Louis Ottofy, A. O. Hunt, and J. D. Patterson, was continued.

The following were elected officers for the ensuing year: S. H. Guilford, President; Geo. H. Cushing, Vice-President; Louis Ottofy, Secretary; Henry W. Morgan, Treasurer.

Executive Committee.—J. Taft, Thomas Fillebrown, and B. Holly Smith.

Ad Interim Committee.—H. A. Smith, A. O. Hunt, and T. W. Brophy.

The newly-elected officers were installed, and the President announced the standing committees as follows:

Committee on Schools.—J. A. Follett, L. L. Dunbar, Geo. Edwin Hunt, C. N. Peirce, and T. W. Brophy.

Committee on Text-Books.—J. D. Patterson, A. O. Hunt, J. B. Willmott, T. E. Weeks, and J. P. Gray.

Adjourned to meet at the call of the Executive Committee.

Editorial.

THE NATIONAL ASSOCIATION OF DENTAL FACULTIES.

ELEVEN years have passed into history since this body was organized in August, 1884. Its general work and the influence it has had in improving the standard of dental operations in this country is well known in all dental professional circles. It was called into being in April, 1884, by Professor R. B. Winder, of the Baltimore College of Dental Surgery, who, at that period, by correspondence with the Deans of the three dental schools in Philadelphia, gradually worked up an interest in the subject. It was no easy task to infuse his energy and enthusiasm into the minds of those first called in consultation. The effort to unify the dental profession seemed, at the time, a hopeless attempt. For years, in fact from the inception of the college idea and its practical illustration in opposing colleges, there had existed the same jealousy and mistrust of each other as formerly had an existence among the practitioners of the profession. While there was an honest effort to educate men, there was no standard by which the work could be regulated, or was there any disposition to unite to form one. The number of students in dentistry was limited prior to the enactment of laws governing it, and very few colleges were possessed with sufficient capital to secure the best ability in any direction. Up to the winter of 1876 it is safe to say that those who struggled with dental education did it at a great personal sacrifice of strength and pecuniary loss. In 1877 a change for the better was apparent, and classes grew rapidly, but no effort was made to improve the

curriculum or to lengthen the course. Men were graduated in numbers who really had had but four months' instruction. They were taken for one session, beginning October 1 and ending, as far as instruction went, the first week in February, the balance of the time to the last of this month being devoted to examinations and preparation for commencement. Until the session of the "Faculties" held in August of the present year (1895), this has been the extent of the course of the largest number of the colleges of the country. It has now been increased to six months.

During the period from 1876 to 1884 a large proportion of graduates were sent out with their diplomas upon one session, superadded to a so-called five years' practice, and were entitled to class themselves as doctors of dental surgery, and to be respected as such. This would not have been quite so serious had the five years' practice been an honest labor for that time. With some it was, and with others more than five years could be placed to their credit. The mass of acceptances were, however, without doubt, based on statements impossible to verify. So much was this the case that the deans of the various schools made but little effort to look behind the certificates presented; indeed, such a course would have been impossible. While in many cases there was a laudable effort to stem this overwhelming tide of destructive influences, there was an element that seemed to make no effort to discover the truth whether or not the applicant for matriculation had had five years of practice or not. In illustration of this a case came to the writer from Europe. The woman claimed to have had five years of practice in Germany. This statement was at first credited, and she was taken as a private student by the writer. It was soon discovered that the five years' practice consisted in cleaning her infant children's teeth. She, of course, was dismissed, and, after futile attempts to enter a college in Philadelphia, she drifted, about January, to the West, and was graduated in March from one of the best of the Western schools with all the glory of a personal ovation.

These not infrequent occurrences became a scandal in the profession, but how to remove them, under the disturbing conditions mentioned, remained a problem.

These were some of the difficulties that confronted the conference in April, 1884. This was composed of Professor Winder, of the Baltimore College of Dental Surgery; Professor Garretson, of the Philadelphia Dental College; Professor Peirce, of the Pennsylvania College of Dental Surgery, and Professor Truman, of the

Department of Dentistry of the University of Pennsylvania. Each felt the seriousness of the situation, but the question was asked, "If we attempt this move will we be supported?" The answer was, "We will try;" and the call for a meeting of colleges was sent out to convene at the Sturtevant House, New York City, August 4, 1884.

It was with a feeling of much anxiety that this meeting was contemplated, and when the time came no one could prophesy with safety whether it would prove a success or a failure. It was in the nature of an experiment. Nothing that had ever been attempted before that came to a successful termination.

The surprise was great to find that the call had met with a response from eleven colleges, each of which had sent a delegate to represent it. Some of these were well known educators, others were strangers, but all were seemingly impressed with the importance of the work.

Probably no body ever met to organize in which the individual members were so much at a loss how to proceed as in this. No precedent existed for the formation of a constitution fitted for such a body to work under, and no one had any conception of the rules to be required for its government; in fact, it was unknown whether those present would even agree to form a temporary organization. This was, however, accomplished, and the basis of association was prepared and almost non committal in its simplicity. It was felt, very justly, that, as this was an untried problem, we should let time and experience teach the members how to formulate rules necessary for their government. The wisdom of this has been more than justified. This meeting adjourned to meet at Saratoga Springs the same week, the American Dental Association having been called to meet at that place.

The most important action of this meeting, and that which stamped it as a body determined to begin earnestly, was the immediate effort to rid the profession at once and forever of the rule of five years' practice. This was done by a unanimous vote, and, although this was the first meeting of a society essentially full of crudities, so powerful was its immediate influence that all colleges, whether members or not, fell into line and adopted this measure of two full sessions.

It is unnecessary to follow this organization through the subsequent years to the present one of 1895. Its history is known, and its actions have been carefully watched and, at times, sharply criticised. It has shown the professional world that it could legis-

late and punish its members for violations of its rules. It has brought dental education to a high standard, and will carry it higher as the necessity occurs. It has led the way for the medical profession to organize a similar association.—indeed, before proceeding with their work, they were careful to secure from the writer full particulars of the organization in which we are at present interested. It advanced the curriculum of all the schools steadily and persistently. It forced all the dental colleges of the country to adopt a three years' course. It blocked the way for the conferring degrees *in absentia*, and insisted that no degree should be conferred except upon a basis of undergraduate work. It has done more than this, for it has made dental education worthy the respect of all intelligent men, so that to-day, after eleven years of work, dentistry stands as the peer of any of the special branches of the medical profession. The best men in the latter regard the time as not far distant when medical schools and medical departments of universities must meet the problem and answer the query, "How can dentistry be absorbed and become absolutely a part of medicine?" This cannot now be answered, but the time is not far away when it will press upon the attention of educators as well as upon professional thinkers.

Having thus run over the history of the work of the National Association of Dental Faculties, what now may be asked, is its condition? We do not think it has reached its final period of usefulness. Indeed, it is believed it has more work yet to do than has been done in the past, valuable as that has been, but we approach the closing of the year 1895 with feelings not over hopeful.

The Association comprises within its fold two classes of workers, those connected with universities and those representing colleges organized from private funds and entirely sustained by the income derived from students. There is a middle class of colleges connected with, but not supported by, medical schools. These receive their support as the last mentioned.

The result of combining two seemingly antagonistic elements has, heretofore, not been harmful, as it has been to the mutual interest of all concerned to advance the standard and live up to it. There has been an earnest effort to respect the decisions of the main body.

The last meeting of this organization, held at Asbury Park last August, was the first in which two attempts were made, one successful, to lower the standard. The first was after voting a seven months' course to reconsider this action and change it to six, and

the other was the conferring of an honorary degree, which the better sense of the meeting repudiated at a subsequent sitting.

The insidious element that seems to have entered this body is one that has wrecked others equally as useful,—the fell spirit of caucus, which was plainly manifested in the election of officers. This is the first time that this has been openly shown, and it marked a dividing line between the college and the university. If this be permitted there can be but one end, as was intimated in our article last month. The university representation *cannot consent to be sunk in the mire of an imperfect standard*, and we can assure the single colleges that they will not.

The *Western Dental Journal*, in a recent issue, somewhat severely took the Association to task for not advancing the standard by adding Latin and other higher branches to the preliminary examination, and also reflected on a certain member for his motion to lay the resolution on the table. From some knowledge of this person's motive in making this motion, it may be well to state, for the information of the editor, that the reason was not opposition to a move in this direction, for, on the contrary, he is fully alive to the necessity of a higher standard at the beginning of the work, but the time, in his opinion, has not yet arrived for this. It will be proper to concede it when the practical side of dental education has been fully satisfied by a full course of at least nine months, and a curriculum sufficient to meet all the demands of professional work.

In the opinion of some, we may have stated the case too frankly. Nearly a year still intervenes before another meeting. Let those interested look well to the future and to the interests of the dental profession that this cloud, now "not larger than a man's hand," be not increased until it overshadows and destroys the best organization ever planned for a beneficent purpose.

The remedy is easy. Let the separate colleges abandon at once the dangerous course seemingly adopted, and take immediate measures to advance the standard in all reasonable ways. With a moderate degree of wisdom infused into its deliberations this can be accomplished without friction, and then the Association of Faculties will live to lead the profession to higher things.

Obituary.

THOMAS H. CHANDLER, A.B., D.M.D.

By the death of Thomas H. Chandler, A.B., D.M.D., the American Academy of Dental Science has lost a Fellow of rare worth, one who had the respect of the profession at home and abroad, and the love of all who knew him intimately.

He became a Fellow of this Society in 1870, and was its president in 1881. Having taken a collegiate course before studying the profession of dentistry, he was well calculated to take the high stand which he has always maintained in regard to dental education. Believing, as he did, that general culture was a better foundation upon which to build a dental education than was the technical training of a medical course, he is to be honored for his efforts to make ours a liberal profession. He was ever ready to assist those who sought his aid, and took pleasure in acquiring knowledge that he might, in turn, impart it to others.

His genial and kindly disposition made his association with us peculiarly pleasant. His high ideal of what the dentist should be is an example worthy of our emulation. His dignified and courtly bearing, his scholarship, and his devotion to his work did much to elevate dentistry to its present honorable position. His aim has been high; his achievements great; his record honorable; and dentistry will forever bear the impress of his life.

Be it therefore

Resolved, That in the death of Professor Chandler the Fellows of this Academy feel that they have sustained a great and personal loss, and the dental profession that of one of its most eminent members.

That to his family we extend most sincere and heart-felt sympathy.

That a page of our records be set aside in honor and affection to his memory.

C. P. WILSON,
DWIGHT M. CLAPP,
R. R. ANDREWS.

Boston, October 2, 1895.

THE International Dental Journal.

VOL. XVI.

DECEMBER, 1895.

No. 12.

Original Communications.¹

DEFORMITIES OF THE HARD PALATE IN DEGENERATES.²

BY FREDERICK PETERSON, M.D.³

DEGENERATION.

THE subject of degeneracy in the human race has for some years been exciting much interest and discussion among scientific men. I may be pardoned therefore for bringing forward a few general considerations of degeneracy as preliminary to what I have to say with regard to one of the physical signs of that condition which is of especial importance to the body before which this brief paper is read.

Degeneracy may be defined as a marked deviation from the normal original type or standard. We recognize it, as a rule, in its effects upon the intellectual life, in the deviations from the intellectual habits and social conduct which we hold in common with our fellows. To the class of degenerates not only belong

¹ The editor and publishers are not responsible for the views of authors of papers published in this department, nor for any claim to novelty, or otherwise, that may be made by them. No papers will be received for this department that have appeared in any other journal published in the country.

² Read before the New York Odontological Society, October 15, 1895.

³ Neurologist to Randall's Island Hospital for Idiots; Pathologist to the New York Insane Asylums; Chief of Clinic, Nervous Department, Vanderbilt Clinic, College of Physicians and Surgeons, New York.

many criminals, idiots, and insane individuals, but also the great majority of persons whom we call cranks or eccentrics, the people who live among us a sort of original life, with peculiarities of mental habit and conduct, and whom we characterize as feeble-minded, odd, quaint, queer, or singular.

A man of talent or of genius often presents eccentricities of the kind to which we refer, but such deviation from the original normal standard need not be morbid in character; it may be a deviation towards a higher and better standard, recognized by his contemporaries or posterity to be such, and to which we on our parts try in the end to conform. It might be difficult at times to distinguish between the eccentricities of genius and the eccentricities of degeneracy. There are one or two indications or tests which will aid us in this. One of the indications—in fact, the chief test—of a normal state is naturally conformity to the social condition in which a man lives. This test applied by itself, however, does not exclude talented individuals and geniuses. Another criterion must be applied to these cases. Is there conjoined with the eccentricity a morbid self-centring of his interests? It is in individuals who concern themselves little with the affairs of the world, but much with personal and selfish matters, that eccentricity of intellectual habit or conduct warrants a grave diagnosis. Now, one of the essential characteristics of degeneracy is its inclusion of transmissible elements, so that the degenerate individual not only bears in himself the germs which render him more and more incapable of fulfilling his own functions in human life, but by his hereditary bequests he menaces the intellectual stability of his descendants.

So much for the definition of the term degeneracy. We will pass on to a brief consideration of the indications of degeneracy.

STIGMATA OF DEGENERATION.

The indications of degeneracy are known as stigmata hereditatis, or stigmata of degeneration. They may be defined as anatomical or functional deviations from the normal, which in themselves are usually of little importance as regards the existence of an organism, but are characteristic of a marked or latent neuropathic disposition. Much study has of late years been devoted to these indices by many investigators, particularly in their relation to insanity, idiocy, and criminal anthropology, and it behooves all who have to do with the development and care of the human body in any particular, and this refers especially to men of the medical

and allied professions, to familiarize themselves with these signs of degeneration in so far as they concern their own special provinces of work. These stigmata are vices of functional and organic evolution. The deviations from the normal may be in the way of excesses or arrest of development. They must be distinguished from the deficiencies or deformities produced by accidents at birth or by disease. I have said that these stigmata are anatomical and functional. But it is more convenient to divide the functional group into physiological and psychic classes. It is the latter which we are more apt to observe in our social relations with degenerate individuals. The psychic stigmata are always characterized by a want of balance or lack of proportion between certain undeveloped or excessively developed faculties and other faculties which are normal. Defect of moral sense, attention, memory, will, judgment, or excess of musical or mathematical aptitudes, may be cited as instances of psychic stigmata. Hence the three following divisions may be made of all the degenerative indices:

- (1) ANATOMICAL STIGMATA.
- (2) PHYSIOLOGICAL STIGMATA.
- (3) PSYCHICAL STIGMATA.

ANATOMICAL STIGMATA.

Cranial anomalies.

Facial asymmetry.

Deformities of the palate.

Dental anomalies.

Anomalies of the tongue and lips.

Anomalies of the nose.

Anomalies of the eye.

Flecks on the iris, strabismus, chromatic asymmetry of the iris.

Narrow palpebral fissures.

Albinism.

Congenital cataracts.

Pigmentary retinitis.

Anomalies of the ear.

Anomalies of the limbs.

Polydactyly.

Syndactyly.

Ectrodactyly.

Symelus.

Phocomelus.

Excessive length of the arms.

Anomalies of the trunk.

Hernias.

Malformation of the breasts and thorax.

Dwarfishness.

Giantism.

Infantilism.

Femininism.

Masculinism.

Spina bifida.

Anomalies of the genital organs.

Anomalies of the skin.

Polysarcia.

Hypertrichosis.

Absence of hair.

Premature grayness.

PHYSIOLOGICAL STIGMATA.

Anomalies of motor function.

Retardation of learning to walk.

Tics.

Tremors.

Epilepsy.

Nystagmus.

Anomalies of sensory function.

Deaf-mutism.

Neuralgia.

Migraine.

Hyperæsthesia.

Anæsthesia.

Blindness.

Myopia.

Hypermetropia.

Astigmatism.

Daltonism.

Hemeralopia.

Concentric limitation of the visual field.

Anomalies of speech.

Mutism.

Defective speech.

Stammering.

Stuttering.

Anomalies of genito-urinary function.

Sexual irritability.

Impotence.

Sterility.

Urinary incontinence.

Anomalies of instinct or appetite.

Mercism.

Uncontrollable appetites (food, liquor, drugs).

Diminished resistance against external influences and diseases.

Retardation of puberty.

PSYCHICAL STIGMATA.

Insanity.

Idiocy.

Imbecility.

Feeble-mindedness.

Eccentricity.

Moral delinquency.

Sexual perversion.

I have thus enumerated the stigmata of degeneration in order to show how numerous they are and in what great variety they exist, not only in the physical organism but in the realms of the general functions of the body and the higher functions of the nervous system.

All this is merely an introductory to the particular subject which I have been invited to present to your attention this evening,—viz., *Deformities of the Hard Palate in Degenerates*. While the palate occupies but a small place in this great category of hereditary stigmata of all kinds, it is one of the anatomical group, and this group is for many reasons the one of greatest importance. In this group, too, it occupies a distinctive place as being among the most striking, frequent, and significant of the anomalies. I will not say of the palate what Dr. Amadée Joux said of the ear, "Show me your ear, and I will tell you who you are, whence you came, and where you go;" but I will say, "Show me your palate, and I will probably be able to tell whether you belong to the great class tainted by heredity, comprising many insane, imbecile, feeble-minded, criminal, eccentric, epileptic, hysterical, or neurasthenic individuals."

Therefore it is to you dentists, who see before you in your daily vocation large numbers of these organs, that the subject now presented to you must have a peculiar interest. Doubtless you are not always brought into contact with the psychic life of the individuals

who come to you for treatment; you may not often be consulted as to conditions outside of your own field of work. But at any rate you may frequently do an immense amount of good, when you discover a pathological palate, by calling the attention of a family to an indication of degenerative proclivity in one of its members. If it be a young person, you may be the first to observe a stigma, and the first to direct attention to a peculiarity which may have enormous significance as regards his future bringing up and care. You will recognize the need of examining him for other stigmata,—anatomical, physiological, or psychic,—and the necessity of a special line of education and development if he prove to be feeble-minded or have a tendency to a psychopathic state, and of throwing about him safeguards against the evolution of eccentric, hysterical, neurasthenic, or other neuropathic conditions.

Before describing the pathological palate I would say a few words about the

NORMAL HARD PALATE AND ITS VARIATIONS WITHIN NORMAL LIMITS.

The palatine process of the superior maxilla forms the anterior two-thirds of the hard palate and part of the floor of the nose. The posterior third of the hard palate is completed by the horizontal plate of the palate bone.

On the palatine surface we find the palatine groove for the descending palatine vessels and nerve, numerous foramina for vessels entering the bone, and pits made by small palatine glands.

Immediately behind the middle incisor teeth is the anterior palatine canal in the palatine suture. The palatine suture is a very rough one. In young bones, as in the facial skeleton I show you here, you will observe traces of the premaxillary suture, which separates the part of the maxilla containing the sockets for two incisor teeth. This is the premaxillary or intermaxillary bone, which is, in some of the lower animals, a separate bone.

Ossification of the upper jaw begins about the seventh week of foetal life, and progresses so rapidly that the number of ossification centres has never been accurately ascertained. Five of these centres are well known, however, and among them are one for the palatine process and one for the premaxillary portion. The palate bone has one centre, from which the ossification spreads into its perpendicular portion and inward along its horizontal plate.

The arch of the hard palate presents considerable variation within strictly normal anatomical limits. A large, wide, moderately high vault is what may be called a normal standard. It means the

highest evolution, judging from the fact that the mouth cavity increases in capacity as we ascend the vertebrate series. Deviations from that standard are not at all infrequent, as you well know, and yet such deviations may be normal. Thus, the palate may be low and broad or it may be high and narrow; it may be short or long in its anterior-posterior diameter; it may be ridged unduly along the palatine sutures, or it may present marked rugosities on its surfaces, especially in the anterior region; yet these variations are normal. Probably we may look upon these peculiarities as a species of compensatory development. Just as in a study of heads we find some very long and low, and others short and round and high, and recognize the fact that shortness in one dimension is compensated for by a corresponding increase in another. So we may regard variations in palatine diameters.

DEVELOPMENT OF THE NORMAL HARD PALATE.

Nothing is more interesting than a study of the development of the mouth and face. The face is, in a manner, chiefly an evolution of the mouth-cavity. The face is characteristic of the higher vertebrates, and increases in importance the higher we ascend in the scale. In some of the lower orders of animals there is no projecting face, but merely an area on the ventral aspect of the head, with a mouth and nasal pits.

The evolution of the face depends upon four factors,—viz., enlargement and fusion of the oral cavities; partial separation of the oral and nasal cavities; growth and specialization of facial region, the elongation of the jaws being the most conspicuous feature; and the development of the nose. The position of the face and oral cavity is determined originally by the head-bend in the embryo, but as development progresses the oral and facial parts enlarge out of proportion to the rest of the head so as to project in front of the fore brain, and the bulk of the face is great in proportion to that of the cranium (in lower animals). In mammals the brain increases greatly in size until it extends over and above the face, and in man finally covers the facial region.

Now, the mouth-cavity is formed in this wise: At first there is merely an oral depression in the ectoderm, on the other side of which is the endoderm, with its alimentary canal and air-passages. Rupture takes place in this depression after a time, the mouth and pharynx communicate, and a single wide cavity is formed. The tongue develops from the floor of the pharynx.

At first the nasal pits open freely and widely into the mouth-

cavity. Then a partition grows down to separate the two nasal cavities, and after this the mouth comes to be divided into an upper and lower mouth by the appearance of two shelf-like projections at the sides of the mouth, which, growing towards each other, finally unite as the hard palate. The upper mouth, for respiration, is added to the nasal cavities, while the lower mouth is left for alimentary uses.

The hard palate, then, is formed by these two shelf-like processes from the inner side of the maxillæ, and these grow at first obliquely downward, with the tongue between them. Then the lower jaw begins to grow with great rapidity, and draws down the floor of the mouth and lowers the tongue. The palate shelves assume a horizontal position and meet and unite in the middle line,—first in front and later behind. Union begins at eight weeks in the fœtus, and is completed in the hard palate at nine weeks, in the soft palate at eleven weeks. Soon after this the nasal septum unites with the palate.

I have dwelt upon these facts in the development of the face, mouth, and hard palate in order to make clear the peculiar way in which the hard palate takes its origin, and to show the marked developmental relations between the brain, mouth, face, and the various walls which serve to separate and divide them. It is evident that arrest or error of development in any one of these parts must inevitably affect, in one way or another, the others.

THE PATHOLOGICAL PALATE.

In passing to the consideration of the pathological palate, I would premise that I am fully aware of the difficulty of making hard and fast rules for the differentiation of the abnormal from the normal, and of the danger of making too positive statements. I have searched literature very carefully, and find that very little, indeed, has been written upon the subject, and it is, in a way, making new paths for others to follow and improve upon to bring this matter to your attention. The phrase Gothic palate is, to be sure, frequently mentioned in literature, but only casually. Several papers have been written upon the *torus palatinus*. I have examined the hard palate in normal and abnormal states for over eleven years. I presume as many as a thousand insane, one hundred criminals, six hundred idiots, and five hundred or more neuropaths of other kinds would fairly represent the number of pathological conditions from which I have gained some of the expert experience which has led me to present this paper for your consideration, and I mention

these facts merely as a justification of my attempt to make a sort of classification of the kinds of pathological palates which should be regarded as stigmata of degeneration. The word Gothic having been so long in use, and the hard palate being much like an arch or roof, I have followed architectural nomenclature in the classification offered :

PATHOLOGICAL PALATES.

- (A) Palate with Gothic arch.
- (B) Palate with horseshoe arch.
- (C) The dome-shaped palate.
- (D) The flat roofed palate.
- (E) The hip-roofed palate.
- (F) The asymmetrical palate.
- (G) The torus palatinus.

As illustrations of these varieties of abnormal palate, I present for examination seventeen casts of the hard palate, mostly selected from among the four hundred and fifty idiots on Randall's Island. I am under great obligation to Dr. Walker and his assistant, Dr. Turner, for making the moulds and casts in these cases.

The seven varieties named are to be looked upon as types merely. Each type will be found to present variations and combinations with other forms. Thus, the Gothic arch may have a low or high pitch, and be short or long. The horseshoe arch (a familiar one in Moorish architecture) is always easily distinguished ; but owing to its conformation a cast cannot well be taken of it to show it in perfect outline. The dome-shaped palate may be high or low, may be combined with asymmetry or torus. The presence of a torus in the Gothic variety is apt to destroy the purely Gothic form, and may cause it to resemble the flat-roofed palate. Under the heading of flat-roofed palate I should include all such palates as are nearly horizontal in outline (of which I have not a good specimen to exhibit), as well as those with inclined roof sides but flattened gable. In the hip-roofed palates we have the sloping sides as usual, but also a marked pitch of the palate roof in front and behind. Occasionally one meets with a palate of this kind with so remarkable a pitch from before backward that it is almost like a Gothic roof turned about, so that the gable runs transversely. Asymmetry in the palate is commonly observed in many of the previously described forms, but occasionally is the only noteworthy peculiarity. It is usual to find asymmetry of the face and skull in cases with an asymmetrical palate.

The torus palatinus (Latin, *torus*, "swelling") was first mentioned by Chassaignac as a medio-palatine exostosis. It is a projecting ridge or swelling along the palatine suture, sometimes in its whole length, sometimes in only a portion of its course. It is always congenital. It varies considerably in its shape and size, so that as many as five or six different species of torus are recognized. It may be wedge-shaped, narrow, broad, very prominent, or irregular. I have said nothing about cleft-palate, for I am not sure that it may be classed among the well-marked stigmata of degeneration. I have found but two or three cleft-palates among the four hundred and fifty idiots and imbeciles on Randall's Island, while a number of cases of this kind with which I have come in contact in my professional life were very far from being degenerates. However, it would seem that there is great need of a faithful study of a large number of cases of cleft-palate in relation to the question of degeneracy.

THE ETIOLOGY OF THE PATHOLOGICAL PALATE.

When we come to investigate the causes which lead to the formation of an abnormal palate we meet with much difficulty. Much could be learned, probably, by the examination of large numbers of newly-born children. As far as my own experience goes, the kinds of palate to which I have devoted this paper are always congenital. I am aware that changes are produced in the palate by mouth-breathing, and that some specialists in diseases of the nose and throat are inclined to ascribe most palatal deformities of the character above mentioned to this cause; but the evidence is convincing that another origin, and that a prenatal one, must be assigned to these deformities. We must look rather to modifications occurring during foetal development, during the evolution of the child, modifications brought about by arrests or errors of development, not so much, perhaps, in the palate itself as in the brain, the base of the skull, and the intricate structures that make up the face and nose, because the relative positions and interdependence of these parts is so marked that any alteration in one must in some wise affect the development and configuration of all the others.

As to the ultimate cause of these modifications which give rise to stigmata of every kind, that must be sought in the nervous mechanism which governs heredity. As the evolution of our bodies as well as our minds depends upon the brain and spinal cord and the countless nerve-filaments which radiate from them to every tissue, so the nervous system plays the most important part in the

influences which have to do with heredity. The nervous co-ordinations must be rearranged by strong stimuli in order to reproduce the hereditary impulse. This is why traits acquired by us in our individual lifetimes are not apt to be inherited by our descendants. If a person loses an arm, his children are not deprived of that useful member, for the nervous mechanism of development which has for ages produced arms in their proper places, and which is fixed in the powerful hereditary impulse of the race, has not been changed. So in the breed of dogs whose tails have been cut off for countless generations, not one is born without a tail, because the nervous co-ordinations governing the evolution of the tail bear down with all the hereditary force of the race since its first beginning (when the tail existed, though the animal was legless) to keep it in existence. If in some way we could reach the nervous mechanism which is responsible for the evolution of the tail, we might modify or even prevent its development.

It is therefore some derangement of the nervous mechanism governing heredity which brings about deviations from the normal type which gives rise to these anatomical, physiological, and psychic anomalies which we designate as the stigmata of degeneration.

How is the nervous mechanism of heredity deranged? It may be readily and profoundly deranged in a variety of ways, for instance, by poisons. Thus alcohol disarranges the nervous mechanism of heredity in such a way that the descendants may suffer from drink-craving, from idiocy, insanity, epilepsy, hysteria, neurasthenia, from shattered nervous systems, for at least three generations, and in these unfortunates we find along with the marked functional stigmata of degeneration these actual physical deviations from the normal type which we call anatomical stigmata. But idiocy, insanity, epilepsy, and the like are in themselves conditions which disarrange the nervous co-ordinations so profoundly as to affect the hereditary impulse and give rise to anatomical and functional stigmata in the descendants. What is bequeathed to the degenerate child is a fragile and unstable nervous constitution. The evidence of this inherited fragility of the nervous mechanism may present itself as insanity, or it may be epilepsy, or it may be feeble-mindedness, or it may be criminal tendencies, or it may be simple nervousness, or hysteria, or certain kinds of headaches, or possibly only eccentricity. All of these disorders are more or less interchangeable, and are merely proofs of an unstable nervous organization. Where such conditions do not develop they may still exist in a latent state and pass as a legacy to another generation. Whether

the neuropathic state be manifest or latent we are apt to find anatomical stigmata of degeneration present on careful examination.

SIGNIFICANCE OF THE PATHOLOGICAL PALATE AS A STIGMA OF
DEGENERATION.

The deformed palate to my mind is one of the chief anatomical stigmata of degeneration. It is true that from this single indication it would not be strictly scientific to adjudge an individual a degenerate. Occasionally, perhaps, a case presents itself where this anatomical stigma alone would suffice to insure a diagnosis of this nature, but usually other stigmata coexist, such as cranial anomalies, deformities of the ear, and the like. The frequency of the pathological palate among marked degenerates, such as insane, idiots, and epileptics, has been testified to by many investigators. Thus Talbot reported forty-three per cent. of abnormal palates in sixteen hundred and five inmates of institutions for the feeble-minded. Ireland makes it nearer fifty per cent. Charon, a later writer than these, found abnormal palates in ten per cent. of apparently normal people, in eighty-two per cent. of idiots and feeble-minded, in seventy-six per cent. of epileptics, in eighty per cent. of cases of insanity in general, in seventy per cent. of the hysterical insane, and in thirty-five per cent. of cases of general paralysis. Naecke has studied particularly the *torus palatinus* in fourteen hundred and forty-nine individuals, normal and psychopathic. He found it present in 23.9 per cent. of psychopathic women (insane, epileptic, idiot, and criminal); 32.9 per cent. of epileptic women; 34.4 per cent. of criminal women; 22.7 per cent. of normal women.

The percentages were smaller in men than in women. A narrow *torus* is more common than a broad one.

Stieda examined fifteen hundred skulls for the *torus* from an anthropological point of view. The skulls were of Prussians, Americans, Africans, Frenchmen, Russians, and Asiatics. He decided that it has no anthropological significance, gives no racial distinction.

While the *torus* is undoubtedly of value as an index of degeneration, particularly where it is well marked, it probably has less importance in this respect than some of the other forms of pathological palate.

In conclusion, I wish to say that in the anomalies of the palate just described we have not only a physical mark of degeneration, but one of the more common of the anatomical stigmata of this condition. And I would like to suggest here, that if the members

of this Society would unite in sending to its museum casts of all the singular palates encountered by them in their professional labors, together with any information they might obtain as to the presence of a highly nervous organization, hysterical tendencies, neurasthenia, epilepsy, feeble-mindedness, idiocy, or insanity, either in the patients themselves or in their immediate relatives, there would be in a few years a priceless collection for some student of this subject to classify, analyze, and draw deductions from, to be presented to your body at some future time.

LITERATURE.

MOREL. *Traité des Dégénérescences.*

MINOT. *Embryology.*

TALBOT. Quoted by Farrar, "*Irregularities of the Teeth*," New York, 1888.

CHARON. *Thèse de Paris*, July 2, 1891.

NACKE. *Arch. f. Psych.*, vol. xxv., 1890.

STIEDA. *Internat. Beiträge zur Wissenschaft, Med.*, Bd. 1.

CALON. *Bull. anat. del palato dura Bologna*, 1892.

WALDEYER. *Ueber den Harten Gaumen*, *Corr. Blatt der Deutsch Anthropol. Gesellschaft*, 1892.

CHANNING. *N. Y. Med. Record*, October 3, 1891.

A NEW APPARATUS FOR CONTINUING ANÆSTHESIA WHILE OPERATING IN THE MOUTH.¹

BY THOMAS FILLEBROWN, M.D., D.M.D., BOSTON, MASS.

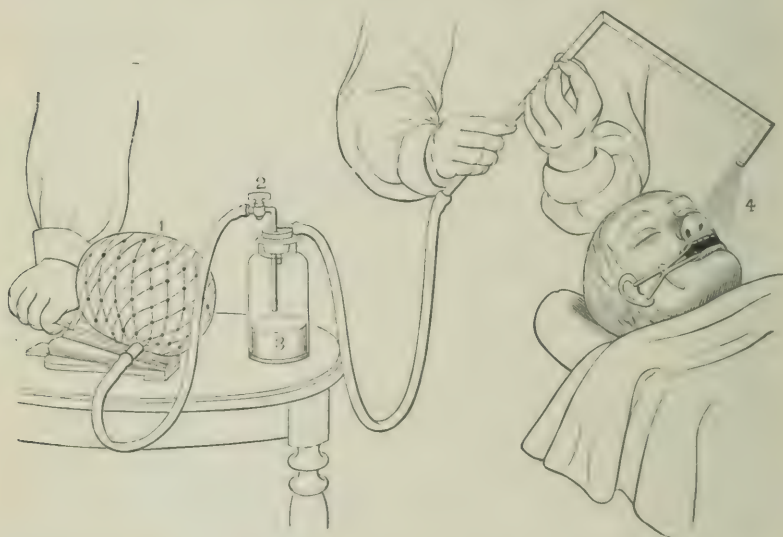
At the Columbian Dental Congress, in 1893, I exhibited an apparatus for maintaining anæsthesia without a face-piece, which I described as consisting of "a bellows, connected by rubber tubing with the long tube of a twelve-ounce wash-bottle, with a stop-cock intervening to regulate the flow of air. From the bottle extends a half-inch rubber tube to the patient. The bottle is filled one-third full of ether. The bellows is inflated and the stop-cock opened, so as to allow the air to bubble up freely through the ether and become saturated with ether vapor. The etherized air is discharged through the second tube, a few inches from the patient's face."

I have since found it unnecessary to pass the air through the

¹ Read before the Academy of Stomatology, October 15, 1895.

anæsthetic, but obtain equally good results by simply passing the air over the ether or chloroform. I have also found that if the administration of the anæsthetic is somewhat prolonged, the evaporation reduces the temperature so low as to prevent saturation of the air; when this obtains, the hand of an assistant or a cloth wet with warm water should be applied to the bottle to raise the temperature to, at least, 60° F.

In cases of children I have found no difficulty in, from the first, maintaining a perfect anæsthesia, but my experience with adults proves that they must be first thoroughly anæsthetized by ordinary



methods, as many adult patients require an almost entire exclusion of air for a time to become fully anæsthetized. I encountered two partial failures before I realized the cause. But with these patients, this method proved more than sufficient, after the anæsthesia was made complete by the ordinary administration. I have lately added a bent metallic delivery-tube, which enables the assistant to stand behind the patient while administering the anæsthetic, and thus be entirely out of the way of the operator. The mouth-gag I believe to be essential to success, and I never omit its use. Perhaps infants might not need it.

I have thus far been intent on establishing the complete success of the anæsthesia, and have made no effort to economize the ether.

As I now use it, four ounces of ether will maintain complete anæsthesia for one hour: further experience may make less sufficient.

With this apparatus, simple as it is, complete anæsthesia may be maintained for any length of time, and any operation on the face or within the mouth of the patient be performed, and the operator will not be interfered with any more than during an operation on any other part of the body. An assistant can use the sponge freely and keep the throat clear of blood and mucus, so that very seldom will it be necessary to use any other means to free the mouth of accumulations. The accompanying cut shows all the parts and will make the preceding explanation clear.

The bellows is one of the ordinary dentist's foot-bellows. The bottle, with rubber stopper, is one taken from an oxygen apparatus found at the dental depots. The stop-cock is not absolutely essential, and some glass tubing will answer to pass the air through the wash-bottle. A tin-worker can furnish the delivery-tube at short notice, and rubber tubing is always at hand, so no one need be deprived of the benefits of this method for lack of an apparatus.

The following twenty-three cases show, I think, sufficient experience with the apparatus to establish the fact of its efficiency and usefulness. Eighteen of these were cases in my own private and hospital practice.

CASE I.—May, 1893. A student in the Harvard Dental School, who kindly consented to be an experimental subject. He was anæsthetized to complete insensibility in ten minutes, without a mouth-gag. He was both willing and able to keep his mouth open.

The mouth-gag was used in all the following cases, after the patient was etherized by the ordinary method.

CASE II.—Male, aged twenty-five years. Removal of non-erupted third molar. Complete anæsthesia maintained twenty minutes.

CASE III.—Male, aged twenty-six years. Operation on lip. Anæsthesia maintained twenty-five minutes.

CASE IV.—Male, aged twenty-two years. Removal of necrosis of inferior maxilla. Anæsthesia maintained twenty minutes.

CASE V.—Female, aged six years. Operation, uranoplasty. Anæsthesia maintained one hour and three-quarters.

CASE VI.—Male, aged eleven years. Operation, uranoplasty. Anæsthesia maintained forty-five minutes.

CASE VII.—Male, aged ten years. Operation, uranoplasty. Anæsthesia maintained one and one-half hours.

CASE VIII.—Male, aged eleven years. Operation, staphylorrhaphy. Anæsthesia maintained one and three-quarters hours.

CASE IX.—Male, aged twenty-nine years. Operation, reshaping flat nostril. Anæsthesia maintained thirty minutes.

CASE X.—Male, aged twenty-four years. Operation, staphylorrhaphy. Anæsthesia maintained one hour.

CASE XI.—Female, aged seven years. Operation, staphylorrhaphy. Anæsthesia maintained one hour and twenty minutes.

CASE XII.—Female, aged six years. Operation, closure of hard and soft palates. Anæsthesia maintained one hour and ten minutes.

CASE XIII.—Female, aged sixty years. Operation, removal of encysted cuspid. Anæsthesia maintained eighteen minutes.

CASE XIV.—Female, aged six years. Operation, uranoplasty. Anæsthesia maintained thirty-two minutes.

CASE XV.—Female, aged six and one-half years. Operation, staphylorrhaphy. Anæsthesia maintained fifty-five minutes.

CASE XVI.—Female, aged forty years. Operation, exsection of right inferior maxillary nerve. Clinic before the New England Dental Society, at the Boston Dental College Hospital. Anæsthesia maintained thirty-two minutes.

CASE XVII.—Male, aged forty years. Operation, staphylorrhaphy, at the Maine General Hospital, by Professor Weeks. Anæsthesia maintained one and one-quarter hours.

This patient was not fully anæsthetized when the operation was begun, and at first the apparatus was insufficient to maintain the insensibility; but after the patient was fully etherized it was more than equal to the work, and several times the tube had to be removed on account of too deep narcosis.

In one other case I attempted its use when the patient was only partially narcotized, and I had the same trouble; consequently I am led to doubt if it is practical to use the apparatus until the narcosis is complete.

CASE XVIII.—Male, aged ten years. Operation, removal of tonsils by means of the cold wire snare. A clinic before the New England Dental Society, at the Oral Hospital of the Boston Dental College, by Professor George F. Eames. Anæsthesia maintained fifteen minutes.

CASE XIX.—At same clinic, a male aged ten years. Operation, removal of adenoid growths, by Professor Eames. Anæsthesia maintained ten minutes.

The following cases, Nos. XX., XXI., XXII., XXIII., were operated on at the Lynn Hospital, Dr. C. M. Smith directing the maintaining of the anæsthesia.

CASE XX.—Male, aged forty-five years. Sarcoma of antrum.

Operated on by Drs. Stevens and Smith. Anæsthesia maintained fifty minutes. "Anæsthesia complete during the whole time."

CASE XXI.—Necrosis of the ramus, including the angle of the under jaw. Operation by Drs. Pinkham and Smith. Anæsthesia maintained one hour.

CASE XXII.—Female, aged eleven years. Removal of adenoids. Operation by Dr. Stevens. Anæsthesia maintained fifteen minutes.

CASE XXIII.—Male, aged forty five years. Sarcoma of antrum. Secondary operation by Dr. Stevens on Case XX. Anæsthesia maintained twenty minutes.

Many conceive the idea that it is a spray which is furnished the patient to breathe, but nothing is further from the truth. If a patient inhales from a sponge or towel saturated with ether, he does not breathe ether as such, but ether vapor. It is just the same if air is forced through or over liquid ether. The air simply takes up the ether vapor, and the patients breathe etherized air, the same as is breathed through a sponge or other inhaler.

The essential merit of my invention is that the etherized air is discharged towards the patient from a point far enough from the face to prevent the apparatus from interfering with the operation going on in the mouth, and in sufficient quantity and with sufficient force to furnish an anæsthetic atmosphere for the patient to breathe without taking in air from outside the current. I will add here that the surplus anæsthetic discharged into the atmosphere will not sensibly affect either the operator or his assistant.

Air containing ether or chloroform vapor has long been used for inducing anæsthesia, but always with an inhaler that covered the face and rendered any operation about the mouth impossible while the anæsthetic was being inhaled. Dr. Snow, in 1849, mixed chloroform vapor with air in the definite proportion of three and one-half per cent., and found it very safe, successful, and economical. Clover, in 1862, used the same mixture as Snow, and devised an apparatus for administering it, the principal feature of which was a large reservoir-bag hung over the operator's shoulder. Snow, about the same time, devised an inhaler lined with lint. The lint was wet with chloroform, and through this the air was drawn by inhalation, which, while passing over the surface of the lint, took up a portion of the vapor.

Dr. Horace Packard, of Boston, a few years since, devised a very convenient and compact apparatus for administering etherized air, which was suggested to him by the Junker system for giving chloroform, and it was the use of this that suggested to me the apparatus

which I have described. My object in writing this article is to record the success which has attended its use in my own practice and that of others, and to further and more completely illustrate its mechanism, that its simplicity and usefulness may be better understood.

ASSISTANCE AND ASSISTANTS.¹

BY C. A. BRACKETT, D.M.D., NEWPORT, R. I.

IN the old days of negro slavery in a portion of our land it was said that differing characteristics between people of different sections might be described thus: A Southerner never does for himself anything which another can do for him, and he never does alone that about which he may have help. The New-Englander never asks another to do for him that which he can do for himself, and he does not have help in doing that which he can do alone. In the old order of things, with people of whom we speak as belonging to the old school, these descriptions were not far from having a good foundation in truth; but time and circumstances have brought changes in the way of doing things to all.

I am myself of New England parentage, the descendant of a stock that had all along been under the necessity of hard work,—harder than we of to-day always realize and remember,—and they brought up their children to work, to work all day, and to work every day, and to work quite after the defined New England fashion. I shall never forget the jealousy which I had when ten years of age of an older boy in the neighborhood who had been hired to help in cutting up the wood-pile which I wished to cut alone.

I got also by heredity, example, and precept other tendencies and other training which included in detail much guidance in regard to the practical affairs of life. I was taught that I should mind my own business; that I should avoid partnership relations; that I should seek to keep my own affairs in my own control, and that I should be cautious about becoming responsible for the doings of others. However poorly I may have learned the excellent lessons put before me, I shall never cease to be grateful to the best

¹ Read before the American Academy of Dental Science, Boston, April 3, 1895.

of fathers and the best of mothers who gave me the substance of all that there may be in me of good. And what I have said of my own case finds doubtless its counterpart in the experience of nearly every one seated about this table to-night. It is the story of a large part of those who have made their lives a credit to themselves, an honor to their parentage, and a service to the world. The spirit of such training can never become superannuated or shown to be fallacious. Superficially, it may seem not quite in harmony with modern methods; essentially, all that is good in each is in entire accord with the other.

This congruity I did not at once see. When I came under the necessity of being the manager of my own affairs, I had a little time of seeking to do everything that I could with my own hands. That time I do not regret. On the contrary, I rejoice to have had the experience just as it was. It was most appropriate to the circumstances of the time; it stimulated my efforts, extended my resources, cultivated my self-reliance; was often that necessity which becomes the mother of invention, and it made the proper foundation upon which to gradually develop the plan of putting out of my own hands that which might be done equally well by others. Twenty-two years I have been a practitioner of dentistry. In the last twenty years of that time I have had help in my work.

On the title-page or in the preface of almanacs we are accustomed to find a statement to the effect that the calculations which follow are accurate for some particular place, as Boston, and that they may be made to serve for a considerable surrounding territory, as New England. My experience has, of course, been very largely dependent upon circumstances of time and place, and greatly modified by those circumstances. For other circumstances the calculation would need to be varied, or perhaps could not be made to serve at all.

When I located in Newport, there was room for me and work for me to do. The work was begun with certain ideas concerning it. Some of those ideas have been proved erroneous; others have become in the passing years more and more positive convictions. Newport is a small city; and it has seemed to me that in at least two prominent particulars dental practice in a small place should differ from that which is permissible, not to say advisable, in a large city. One of these particulars has reference to the subdivision of practice, the making and following of a specialty within the specialty. In the large city the dentist may do no extracting, or he may do nothing except extracting. He may give his whole

attention to the general care of children's teeth, to the correction of irregularities, the conservation of adult's natural teeth, the insertion of artificial teeth, crown- and bridge-work, or the practice of oral surgery, with the probable consequence that the entire community has its dental needs the better served for his so doing. Again, in the large city, where there are many practitioners, the man of experience, of superior abilities, extending reputation, and rapidly growing practice may increase his fees beyond the ordinary, or beyond what they were in his beginning, and this, if properly and honestly done, without injustice to any one. There are inexorable limitations to the amount of work which one man may do in his life, and it is legitimate that the compensation for that work should be influenced somewhat by the same laws of supply and demand which dominate values in the commercial world. The express train would cease to be an express train, or to possess the advantages of an express train, if it went at the speed of an accommodation train and stopped at every station. The railroad system which stopped every train at every station would serve but poorly the convenience of its patrons. So in the large city, the dentist upon whom extraordinary demands are made, and who can command extraordinary compensation for his genuinely skilled and superior services, may be not only justified in avowedly making his fees high, but he may find it his duty to do so in order to so limit his work that his physical and mental condition shall be always such that his patients may invariably receive the superior service for which they pay. Further, he may by such course, without making hardship for any not well able to pay for his service, be aiding in justice to his dental neighbor, equally faithful, but younger, less experienced, or less well known.

I am unable to mention this subject of fees without an expression of caution to men, and especially to young men, that they do not put effect in the place of cause, and be hasty and arbitrary in demanding the high fee, thinking more of that than they do of first attaining the superiority of service. There are needed many more accommodation trains than express trains, and we should all seek to avoid mistaking the calling with which we are called. In the small town the plan of indiscriminately raising the fees in order to lessen the volume of practice is not usually a thing to be accomplished without imposing hard conditions upon some dwellers in the community.

While, perhaps, having a smaller proportion of extremely poor people than most places, Newport does present an exceptionally

great range in the material means and the advantages which means command, of its population. A proper share of all these classes of people rightfully expect that their needs for dental service shall be met by local practitioners, and they are so met. A moment's thought will show that a practice of such range of demands is more complicated to manage with satisfaction to all concerned than is one more nearly uniform in means, advantages, standing, desires, and ways of doing things. In the complex practice assistance seems to have particular adaptation, and actually independent operative assistance may probably be more readily made helpful than in an exclusively high-class practice.

Except it may be in regions out of the range of the intimate acquaintance of those who are assembled here, the taking of students—that is, entire novices—into offices, with the double object of the principal gaining assistance in his work and the young man being made a dentist, is happily almost entirely a thing of the past. Some of us can almost remember the time when the student of general medicine got his instruction, both theoretical and practical, largely from a private preceptor. Every one of us is cognizant of the fact that even up to the present a similar plan has been followed in the study of the law, but in the law the plan is fast passing out. It is to-day almost forgotten that it ever had place in the study of medicine. Such of it as continues in dentistry can advantageously be only to supplement and make more perfect the teaching of the schools. While it is to be maintained that the schools are right in requiring the attendance of their pupils through three full school years, it is to be admitted that there are certain graces that have their acquirement and cultivation greatly favored by a little experience in the atmosphere of a refined private office.

In my own case as a student in an office, and in the single instance of my being a preceptor to a student in my office, the experiences were gratifying and, I believe, thoroughly profitable to all concerned; but in each case it was understood in advance that with all reasonable celerity the advantages of the school were to be embraced and the degree attained. But in multitudes of cases of students in offices the arrangement has not yielded the most profitable results. The preceptor, through incapacity or inattention, has failed to do his duty in wisely and judiciously superintending and pushing the studies of the learner, while on his part the learner, even with the best desires and intentions, has been incapable of rendering the principal such help as he would have

been glad to have. In proportion as the student becomes advanced and experienced, wherever that progress has been made, the profitability of the office relation increases. The advanced student is more apt to learn from what he sees, and he can render in return more efficient service.

This leads me to say that in every practice whose volume justifies considerable assistance, that assistance may be best rendered by one who has had the teaching and the training evidenced by the possession of the degree. For nineteen years I have had in my office graduate assistance. In succession four different men have occupied the position. With myself, there have been five parties in interest. According to the best of my knowledge and belief, there has been no time when any one of the five would not have testified that the arrangement had been a profitable one for him. By such plan each party gets the best end of the bargain, while the patronage of the office is more promptly and better served. The principal is relieved from demands which he could not possibly meet, and this surplus which his attainments and reputation have attracted, instead of being driven away, remains to be acceptably served under the same roof, with his advice whenever needed, and in a way to yield to him some return,—a fair proportion.

The assistant is presumably a recent graduate, one who has his name and fame to make. I believe the young dentist at the time of obtaining his degree is more practically educated—that is, he is better fitted for actually doing his work—than is the young man in most of the other professions and specialties at the time of receiving his degree. Of course, the young dentist has still much to learn from experience,—I suppose most of us would say as much after graduation as before; but the principal thing which the young graduate needs is a chance to go to work, the opportunity to show what he can do, to inspire confidence and to become known. This the assistant's position gives him. Being vouched for by one whose recommendation is reliable and influential, his work begins at once, his income begins at once; and idleness and waiting, the proverbial starvation period, are eliminated. He gets compensation in money, he gets it in constant conference, aid, and counsel from the older and more experienced man, and he gets it in a growing and developing practice for himself which the transfers of his principal and his own faithful competency are all the time building up.

This assistant, of whom I have just made mention, should be,

like his principal, an all-round man, capable of doing with his own hands everything, operative and mechanical, within the usual range of a mixed dental practice. Particularly should this be the case if the volume of the business of the office is sufficient for the employment of only one assistant; although there are instances most satisfactory in their general working, of the association together of two men, one of whom, from taste and capacity, gives his attention to the operative department, while the other, for like reasons, attends to the prosthetic branch.

During a large part of the time for the last twelve years I have had regularly a second assistant, whose work has been entirely or almost entirely in the laboratory. The intent is to have the person in the laboratory do the laboratory work, the whole laboratory work and nothing but the laboratory work. During these dozen years the place has been filled by a succession of different individuals with differing qualifications, but usually with a good degree of competence for the work. Several times the place has been occupied by a young man who had had one or two years in a dental college, and who found it convenient to spend a summer vacation or a longer interval in earning some money, while at the same time adding to his store of knowledge and experience. Two young men were of the kind giving their whole attention to laboratory work. One of these was a young Englishman, who had been regularly through a portion of the long apprenticeship prescribed in his native land, and the other was a young colored man. Each one of these was particularly capable in his work. The young colored man of good abilities of the right sort may find in the dental laboratory full, congenial, and remunerative employment in any community where there is the work to be done; and he may thus make a success in locations where he could hope for little as an operator or as a general practitioner.

To fill the laboratory man's place it is far from necessary that one be a dentist. Though it is well for him to know something of anatomy, physiology, and pathology, he is likely to be more helped in his work by a knowledge of physics, chemistry, metallurgy, and the principles of force and mechanics. One who has served an apprenticeship to the jeweller's trade will usually be found to have special aptness in neatly and ingeniously constructing the varied appliances needed to meet in the best way the requirements for regulation and replacement.

For nine months I have had in my laboratory a young woman, and for six months, with such occasional little assistance as the

others of the office force could render, she has done alone my laboratory work, and also, as she had opportunity, some work in the same line for several of my dental neighbors. Quite a large part of her teaching during the first three months was by a proficient young man who had had two years in the Harvard school, and who spent the summer vacation in the laboratory with her. Until she came to the laboratory she had not had practice in any similar occupation, and, as would be expected, her present capacity for the despatch of the work is not what it will become with more experience. She is most careful, painstaking, and earnestly scrupulous in seeking to avoid chances for error and failure. She began the work with the avowed purpose to make it a permanent occupation; and I must testify that the experience thus far has served to confirm my long-held conviction that this field, in which women hitherto have done so little, may be and, doubtless, in the future will be one in which they will appropriately and helpfully do much.

While I am not, in a certain sense of the term, a woman's rights advocate, I am an earnest believer in the idea that any woman should have the right, does have the right, to engage in any worthy occupation for the pursuit of which she is capable, and she has the right to proper compensation for work which she does. As a worker she is entitled to no whit less respect, but rather the reverse. In our section of the country there are very many more women than men. Of these women a large proportion are so circumstanced that they must be dependent upon others for support or they must do something to help themselves. How infinitely more honorable is the spirit of self-helping independence.

During a good many years I had an office-boy, a succession of office-boys, whose services, while not always most acceptable in manner, were a real help. The office-boy is still retained, but for several years his duties have been entirely outside of the office.

One of the most conveniently useful members of the office *personnel* is the office young lady. She comes in the morning and sees that the rooms are aired and dusted, and everything neat and in order, and so kept throughout the day. She sees all the patients as they come in, learns the objects of the calls, makes appointments, and transacts with callers all the business which she can. She assists ladies and children in removing their wraps, and seeks to contribute to the comfort of all. She prepares ready for introduction into the cavity filling-materials of various kinds. She assists in the application of the rubber dam or in the use of other agencies for maintaining dryness. She holds the rubber beyond the border

of a far-reaching cervical cavity, she aids in the starting of fillings, she anneals gold and passes it to the position where it is to be packed, or with the hand-mallet consolidates it; and she does numberless things to help on the progress of an operation. However much we may pride ourselves on our ability to perform any operation unaided, there is no denying that in many operations our own comfort and that of the patient may be far better served by two pairs of hands than by one. After every patient the young lady sees that all instruments and appliances are cleaned and restored to their places before she summons the next patient. She should do as much as possible about recording the cases, keeping the books, sending and receipting the bills, and looking after a portion of the office correspondence. For more than a year I have been a good deal helped in my correspondence by the use of a phonograph and a type-writer, the letter being spoken by me to the phonograph, and the young lady and the machines doing the rest. The young lady attends to the telephone, and is the general means of communication about the office, and, as far as possible, between the office and the outside world. She is engaged with the understanding that she is to make herself useful in every possible way about the office.

A practitioner of dentistry who has always worked by himself can have little idea how convenient and how comfortable a thing it is to have such assistance as I have just named. The presence of a young lady about the office, instead of being looked on by patients as an intrusion, is regarded by them as a pleasant thing, and they are quick to appreciate the shortening of operations and the other contributions to their comfort which she is able to make.

I am not proficient at all in the science of economics, but I believe there are sound principles underlying such combinations of workers as I have described. Not all portions of the work in a dental office require the skill of the specially trained and experienced practitioner. When the demands upon the office become more than the dentist alone can meet, it is wise in him to delegate to other hands that which other hands may do. He may thus retain and conduct a practice of a volume otherwise impossible, receiving therefor a compensation which is shared with those who are given employment, and who share in the service. Rightly managed, the plan is a consolidation of interests to the advantage of all,—those who serve and those who are served.

THE HEROIC IN DENTAL OPERATION, AS CONTRASTED WITH CONSERVATISM.¹

BY C. V. KRATZER, D.D.S., READING, PA.

THERE may be a diversity of opinion as to what constitutes the heroic in dentistry; there may even be some scepticism as to the propriety of applying the term at all to operations in our branch of the healing art. It is not proposed here either to set up a standard or discuss the question of propriety in the application of terms.

Strictly speaking, the combination of terms in my title constitutes a paradox, for the true hero is the one who conserves the interests of his fellow-man. The subject will be viewed here, however, in a broader sense, the terms representing diametric positions, so to speak, and in this light it affords us room for argument.

The term heroism is often a misnomer for selfishness, and in no sphere, perhaps, does this apply with more aptness than in the practice of dentistry. The dentist who employs so-called heroic measures in the fearless removal, beyond the bounds of necessity, of strong and healthy tooth-structure, so that he may erect a glaring and artistic substitute of gold, is either intensely selfish or grossly deluded, for at the expense of his patient's comfort and, unwittingly, sometimes, his own vitality, he seeks to cover himself with glory, while he in no wise enhances the appearance of his subject's mouth, nor, relatively, compared with other possible means of restoration, does he truly compensate his patient or himself for the vital strain and effort.

A few weeks ago I replaced with a porcelain crown a tottering gold bicuspid contour filling of heroic proportions, which had been electro-malleted into place some eight years ago by a gold contour enthusiast. The operation was the result of seven consecutive hours of labor on the operator's part and seven hours of painful physical endurance on the part of the patient. It served the purposes of mastication for little more than seven years, and preserved the remaining tooth-structure from decay for scarcely half that time, as indicated by the extent of decay around the base, nothing but the deep-root anchorage serving to retain it. Now, the question arises, does such work pay when all the elements of time, labor, endurance, and expense are taken into account?

¹ Read before the Odontological Society of Pennsylvania, November 9, 1895.

Such operations are unquestionably heroic in artificial conception and extent, and yet there is a conservative idea in the leaving of weak enamel walls, a conservatism which is false, for it is exposing, rather than protecting, a weak point. A little more of the heroic in the removal of such walls, and the substitution of a gold, porcelain, or combination crown would be more durable, and avoid much labor and all the suffering and necessary endurance by the patient.

In progressive dentistry there is danger of going to extremes; there is a tendency to overdo; we are apt to get on hobbies and ride them too hard. The lamented Dr. Marshall Webb, a noble, self-sacrificing man, made this mistake; he did much for dentistry, and through dentistry for humanity; but one of the effects of his teaching has been to develop a class of contour enthusiasts; and some of these, in emulating the example of their illustrious teacher, have gone to greater extremes than even he ever dared to; and, without the skill he possessed, have made many sorry failures. We have all seen cases of gold contours in which the principle was carried to an excess which brought the filling beyond the original lines of the tooth; and this undue exposure of masticating or cutting surface, no matter even how well the work was done, would surely bring about its own destruction; such operations are certainly heroic, and, compared with the other extreme of cupped fillings, are perhaps less efficient as preservative measures. It has always seemed to me that in the building of large contour fillings, which involve the masticating surfaces of bicuspid and molars and the cutting-edges of incisors or cuspids, it is better to keep within bounds; in other words, to have the restored portion a little within the limits, as a rule, of the original outlines. This I would call conservative contour.

In prosthesis it is certainly heroic practice to excise strong and healthy incisors or cuspids so that the roots may be used for attachment of a dental bridge, but the latter can be made quite as substantial and slightly by properly fitted open-faced gold caps as anchorages, entailing the sacrifice of but little if any tooth-structure.

The heroic proportions, compared with the meagreness of its support, of some exaggerated bridge-work—or its ruins—which we have seen sometimes cause us to wonder why some men do not experiment upon the yielding sands of the ocean beach where they might drive a pile or two, and then, by building and building to this pier, learn just how far it is possible to project a cantilever over the

boundless waves without crushing its support or itself. Happily, however, those who thus abuse the prosthetic idea and the principles which have been evolved from chaos for mankind's good, are largely in the minority, and belong principally to the charlatan class, which breathes a peculiar atmosphere, and is almost as distinct from legitimate dentistry as is the witch-doctor from the true physician.

Perhaps the one branch of practice which affords the best opportunity to demonstrate the difference in virtue between the heroic and the conservative, as applied to that branch, is the treatment of exposed pulps. I shall not enter into a discussion of this subject here, but the test can be made in a given case by employing the best known means of capping, and when, sooner or later, you are satisfied, by the result and inflammatory action, that there is an incompatibility in that tooth, then remove the stopping and try heroic treatment; presuming that the after-treatment is properly done, your testimony will undoubtedly be in favor of the latter, and yet there may be, and doubtless are, cases of exposed pulps which live comfortably under so-called conservative treatment for an indefinite period of time; but in all our profession I know of but one man who claims to be uniformly successful in this line.

It may not be improper to term heroic that firmness on the part of the practitioner which prompts him to insist upon pursuing that course which in his judgment the exigencies of any particular case indicate irrespective of his patient's judgment and wishes.

We are guided by our judgment in applying means of relief for whatever lesion confronts us, and firmness in our judgment inspires our patients with the necessary confidence in us.

We should employ heroic measures when necessary, and conservative when admissible; but whatever the character of our manipulations, a conservative interest in the sensibilities of our subjects should never be lost sight of; every operation should be performed as nearly without pain as it is possible with the facilities at our command. Unfortunately for us, many of our manipulations are necessarily so painful, notwithstanding the exercise of the greatest amount of care, that our patients regard us as heartless beings and themselves as the heroes, and in some cases, doubtless, their estimate is true, but to practise dentistry honestly, conscientiously, as most of us do, requires a heroism which the public is unable to appreciate. We are sometimes accused of being mercenary, of working only for gain and demanding exorbitant fees. No estimate of humanity could be more unjust. We recognize that it is not all

of life to pursue a selfish end, to work and strive for self-aggrandizement, to jostle and crowd, to scuffle and tussle for worldly gain. We, as dentists, exercise our professional attainments for compensation; we expect, and sometimes receive, a fair remuneration for our services, for by that we live largely; but underneath the business surface of our professional intercourse with our patrons there is a nobler purpose, a grander aim,—a desire to give to our patients the benefit of all the skill we possess, to do for them the best we can, to work for them rather than upon them. We like to feel, when an operation is completed, that it is well done, that as a recompense for our self-sacrifice we have reached a substantial result.

There is a feeling of satisfaction in contemplating an operation well performed, an operation which gives promise to meet the intent of its building, that cannot be approached by any pleasure occasioned by the mere receipt of a money fee.

And surely this is not selfishness. Our patients' interests more than our own is the issue. We like to know that some one has been benefited by our effort, that humanity has been well served by the restoration, at our hands, of an impaired human function, and this, more than anything else, is what characterizes us as a profession,—the self-sacrificing interest in the welfare of our patients. We labor to prolong life: not our own, but that of those who come under our care.

TREATMENT OF DECAY IN APPROXIMATE SURFACES OF BICUSPIDS AND MOLARS.¹

BY JULIUS G. W. WERNER, D.M.D., BOSTON, MASS.

For the average person the practice of dentistry need be no more tiresome nor detrimental to health than other professional occupations. When a dentist, working at the chair from six to eight hours a day, becomes feeble in health, pale, and careworn before or about the time he reaches middle life, it must in a great degree be attributed to a constant neglect of laws governing health. Eight hours' work, eight hours devoted to recreation (and by recreation I mean physical and mental culture, counteracting injurious tendencies one finds in his daily occupation), and eight hours sleep and rest ought not to be considered a hard lot even for a dentist.

¹ Read before the Harvard Odontological Society, Boston, March 28, 1895.

I find my calling a source of pleasure and satisfaction that I should not expect to find in the general practice of medicine, or in any of its specialties, except dentistry. With our modern mechanical adaptations, improved instruments, and the less pain-producing methods of operating, dentistry need not be very painful nor fatiguing to either patient or operator.

To us it should be a source of great pleasure and satisfaction that such a large percentage of the operations we are called upon to perform are of a surgico-mechanical nature, whose *modus operandi* and prognosis are well understood, scientific, and eminently satisfactory. With us it is surgery and mechanical art that stop decay and restore lost tissue and function. No pills concentrated or diluted *a la* Hahnemann; no mind-cure, Christian science, hypnotism, or the like, will ever cure or help in restoring decayed tooth-substance.

I am to say a few words on the filling of approximate surfaces of bicusps and molars, and on the great importance of such decayed surfaces being restored to full or very full contour. Let us consider, then, that we have decay between two bicusps involving the greater portion of the approximate surfaces, and where good judgment and favorable conditions call for a lasting or so-called "permanent" filling.

If such cavities are filled with cement at the end of a year or two at the longest, the fillings will have become worn sufficiently to need refilling. If they are not then refilled to a flush or full contour condition, the approximate surfaces will either become unnaturally crowded together, or there will be a space left between the teeth, affording lodgement for food, which makes it uncomfortable, unclean, and irritating to the gum. If such decayed approximate surfaces are filled with gutta-percha, a practically similar defective condition will occur in a short time; if filled with amalgam, we get discoloration of tooth-substance, oxidation of the filling-material, and weak edges, particularly at the cervical wall. Again, amalgam as to looks and, according to the belief of many, as to health is not a very desirable filling-material.

What must be considered then, on the whole, the most desirable and lasting filling for such cases? It is gold, soft, non-cohesive gold, with perhaps gold and tin at the cervical wall, and gold and platinum near the grinding surface. These filling-materials, from their malleability, can be so adapted to decayed and worn tooth-substance, and are so compatible with it, as to restore perfect contour, and when skilfully used will prevent decay for many years,

in some cases forever. I have always been a thorough believer in gold, and am more strongly convinced to-day than ever of its merits as a filling-material, when skilfully used, and when full contour, and even more than full contour, of the decayed tooth-substance is restored.

The merits and demerits of gold depend on the judgment and skill of the operator much more than upon a so-called compatibility or incompatibility with tooth-substance. That all-hammered, all-cohesive gold fillings, which only restore partial contour, should fail in anything but the very best tooth-substance need not surprise nor discourage any one. It is very different when soft or non-cohesive gold, under matrix pressure, is thoroughly adapted to the cervical wall and all the edges of the cavity, and cohesive gold is used only near the grinding surface, and the whole filling is a thoroughly condensed and a well-rounded-out full contour operation.

To go still further, when soft, non cohesive gold in conjunction with tin foil is firmly packed against the cervical wall, and eight-tenths of the cavity is filled with soft or non-cohesive gold and the remaining two-tenths with cohesive gold and platinum, we then have what has proved, in my experience, an eminently satisfactory and decay-preventing combination. Such fillings will show, after a while, in many cases a slight oxidation of the tin and gold portion at the cervical wall, but no discoloration of tooth-substance, and give a condensed, hard grinding surface that in years after will show little if any wear and, I may say, little or no decay. But you may say that such operations will involve an amount of time and pain to the patient that will make it difficult to apply it in practice as a general rule. To this I reply an emphatic "No." To the one skilled in adjusting a properly shaped steel matrix, such operations are reduced to simplicity for the operator and comparative comfort to the patient.

Let us take a case in question: Two extensively decayed approximate surfaces of either bicuspids or molars are presented for treatment. If they have been filled with either cement, gutta-percha, or amalgam, and their worn or defective surfaces have allowed the teeth to come together, the opposite of full contour, the first thing to be done is to spread them apart sufficiently to gain the necessary space. This done, the teeth should be allowed to rest from two weeks to two months, as may be deemed most advisable. By so doing the teeth become firm and rested in their new and proper place, and the gum is pressed out and away from the decayed surfaces, giving space and accessibility to all portions of the

tooth to be operated upon. This spreading apart of the teeth and pressing away of the gum can be achieved in various ways,—for instance, with gutta-percha, cotton, waxed linen tape, the Perry separator, or all combined. If, in the case in question, they are cavities of decay with no fillings, with soft and sensitive dentine, a good way to proceed is to disinfect the cavities with camphophénique, or oil of cloves, and fill temporarily with cement, in whole or in part, excavating little or none, and proceed with the separation to acquire the desired space. Cases treated preliminarily in this way are, when finally and permanently operated upon with gold and the matrix, in a much improved condition, and the patient thereby experiences less pain and annoyance, the tooth not being sore to the necessary pressure.

To adjust a steel matrix, hold such firmly in its proper position with a wooden wedge at the cervix, gutta-percha being packed all around it, and, if necessary to give steadiness or to gain more space, to apply a Perry separator, is to the experienced but the work of a few moments. Nor is a properly shaped steel matrix, firmly and accurately adjusted, painful to the patient, but, on the contrary, it steadies the tooth to be operated upon and gives to the patient a feeling of support and comfort. Having the cavity properly excavated and shaped, and the matrix firmly adjusted, we begin to fill to full contour.

A much-favored method with me is to fill a small portion of the cavity, that of the cervical wall, with soft or non-cohesive gold and tin, in proportion of one sheet of No. 4 gold to one-half sheet of No. 4 tin-foil, folded into suitable strips, with the gold on the outside and the tin inside. I believe soft gold and tin at the cervical wall to be a better decay-preventive filling than gold alone, and years of practice in this, both with matrix and without, have confirmed this belief. The slight oxidation of the tin seems a direct benefit, and has no special disadvantage, for we get no tooth discoloration from it, as is the case when amalgam is used.

The non-cohesive gold and tin-foil at the cervical wall and all that portion which is of soft or non-cohesive gold should be condensed with hand-pressure. The last two-tenths of the filling, the portion which comes towards the articulating or occluding surface, is made of cohesive gold or, what I like better yet, of gold and platinum, and it should be annealed and hammered well into position.

We have, then, at the cervical wall soft or non-cohesive gold and tin, then the greater portion of the filling of soft gold, and the remainder of gold and platinum. All but the last portion of

the filling is made with hand pressure, the whole being so shaped with the matrix as to make it a well-rounded, solid-fitting, full-contoured filling.

What do I believe, then, to be the essentials of success in treating decayed surfaces of bicuspid and molars? First, the matrix; second, soft or non-cohesive gold and tin at the cervical wall, and gold and platinum at the occluding surface, and, third, the whole filling to be solidly and thoroughly condensed against the walls of the tooth and matrix, making it well rounded out to full contour, at or near the grinding surface, with a free space near the neck of the tooth and the gum. When two approximal surfaces are filled in this way nothing but gold touches, and the tooth edges are far apart.

In cases where it has been necessary to do considerable separating of the teeth, and where the gum had to be pressed out and away from the margins of the cavities, as, for instance, in model marked No. 238, the gum will grow down and fill nearly all the clear space that always should be near the neck of the teeth.

In properly-shaped, full-contour work each act of deglutition causes enough suction around and about the cervical wall, the neck of the tooth, and the edges of the filling to keep the secretions changed, and in this way helps materially towards lessening re-decay.

The one who has experienced the discomfort and annoyance, amounting at times to actual painfulness resulting from spaces between approximate surfaces of bicuspid and molars, where food crowds in, irritating and inflaming the gum, can appreciate the comfort, satisfaction, healthfulness, and cleanliness that exist where full contour keeps out food and protects the gum.

In my estimation no words are strong enough to condemn the semi-barbaric method of filing teeth apart, leaving so-called self-cleaning spaces, which really are and should be called "self filling" spaces, or of leaving any space between, or any flat approaching fillings. Such are unnatural, unscientific, and unclean. Non-comprehension of nature's design, unskillfulness, incompetency are accountable for such methods of operating.

How different when, by a thorough understanding of what is needed and a love for one's calling and duty, a delicate and firm hand becomes skilled enough to restore such decayed approximate surfaces to full contour, comfort, beauty, usefulness, and permanence.

Reports of Society Meetings.

NEW YORK ODONTOLOGICAL SOCIETY.

A REGULAR meeting of the New York Odontological Society was held on Tuesday evening, October 15, 1895, at the New York Academy of Medicine, with the President, Dr. Northrop, in the chair.

The minutes of the last meeting were read and approved.

Dr. Frederick Peterson then presented a paper entitled "Deformities of the Hard Palate in Degenerates," which elicited the following discussion.

(For Dr. Peterson's paper, see page 719.)

DISCUSSION.

Professor Peirce, of Philadelphia.—I desire to acknowledge that it has been a great pleasure to listen to the essayist's paper, and especially so because it is a very good omen in our profession to have a paper of this kind read before any dental society. It is evidence that we are broadening our opportunities, and are looking beyond the mechanical and financial part of our profession. The paper presents many sides, and it is difficult to discuss it, because the doctor has gone over the subject thoroughly, and leaves but little to criticise or to add. The first inquiry is, What is degeneration? The essayist answered that in his first paragraph. He said it was a morbid deviation from a typical standard. That is about the idea. We all know that Nature seldom makes two things alike,—indeed, never does. It is, therefore, very difficult for us to say to what extent this variation may take place in the development of any organ of the human family, and yet not be beyond the limits of normal or not be morbid. We are all familiar with a variety of palates. When they go to a certain extent we call them monstrosities, and when they become such we try to correct them and bring them as near as possible to the normal type for the advantage of the patient. In speaking of degenerates, the most unfortunate part of it is that all degenerates are congenital. They are victims, because the unconscious biology does not differ from conscious biology, and therefore a development that is influenced in embryo is a development, of course, far beyond the influence of the victim. They are therefore helpless and innocent victims, for the biological law of develop-

ment is unyielding. The victim is here because he could not help himself, and that is the unfortunate part of degeneracy. The question that interests me more than anything else is to see if we can trace any cause for this deviation from the normal,—whether we can go back and get any indication whatever as to why this development has been abnormal and resulted in a victim who is an unfortunate member of society? I wish the doctor had gone a little further into histology, because he is evidently very competent, and given us some idea of just how changes take place, and what would be the influence that would be exerted on the developing tissue to bring the result. Let me illustrate: an illustration that I believe I got one day from Max Nordau's book. You know he wrote a remarkable work on degeneration, which has been criticised the world over. He throws a stone into the water: the impulse of that upon the fluid is in proportion to the condition of the fluid as well as the force of the stone. Then he states that, taking the cortical brain-cells, the impulse of nutrition is responded to in those cells in proportion as they are in a condition to receive. The inference drawn was, that if there is some habit of either parent that has placed those cells in an abnormally responsive condition, then we have either an arrest or a modification of healthy development, and so we may have what is called physical degeneration. The idea was carried out, giving some idea of how the physical degeneration took place; and, having the physical, we must have psychical degeneration as a result. One is dependent upon the other, and we cannot have one without the other.

Degeneration, as Dr. Peterson has said, may manifest itself in the shape of the head, in the size of the ear, in peculiarities of the eyes, nose, teeth, and palate. They are all simple expressions of abnormal nutrition, and abnormal nutrition because there has been some abnormal germ in the embryo. Another question that presents itself is, If these degenerates can reproduce, we are going to have a large class of them in society, very soon a species: but, fortunately, there is another biological law that comes to the rescue, and that is, that where we have a true degenerate, any germ of degeneracy in the individual will be increased probably in the first and second generation, but in the third generation, it is hoped, becomes sterile. It is stated that degenerates cannot reproduce beyond the third generation. This being so, there cannot be a race or species of degenerates. A true species would be normal in that it would reproduce like the parent. Degenerates do not produce like themselves. There is always an increased degradation in the reproduc-

tion until the third generation, when sterility shuts it off; so society is protected.

When the doctor closes the discussion, I hope he will give us his idea as to whether he thinks degenerates are a return to an ancestral condition, and whether in any one of these conditions which he has exhibited he thinks it is a retrogression to an ancestral type. It is an interesting question, whether there has been some form in lower normal life to which they are simply a return or reversion, or whether the abnormality is owing to some unresponsive condition of the cell due to the degenerate germ having been there implanted in embryo.

Professor Abbott.—I have to confess an inability to properly discuss a question of this importance. It is a question that I have never studied specially, although I have seen many cases of the kind which Dr. Peterson has spoken of in his paper. I have never studied it for its sake and for the sake of the human race. There is one point in connection with the subject, however, which I think the doctor has overlooked, which we, as dental surgeons, recognize. That is, that in almost every instance of abnormal development of the bones of the face abnormal development of the teeth is present. This condition of the dental organs probably dates, for its origin, as far back as the beginning of the formation of the palate. These anomalies indicate something wrong in the first beginning of the development of the child. The teeth have been overlooked by men in the study of this question. Not one of the models shown here this evening has a normal type of teeth.

It is a fact that all degenerates, if they attempt to propagate, as Dr. Peirce has said, become sterile and soon die out, provided they intermarry. Such families disappear entirely within a few generations. The question often arises, Are we really degenerating as a race in the world to-day? This question was discussed at some length in a criticism of Nordau's work by Charles A. Dana, of this city, in the June, 1895, *Forum*. He says that in 1880, from the statistics in this country, there were eighteen hundred and sixty-three lunatics to the million people, and eighteen hundred and fifty-three idiotic, and in 1890 sixteen hundred and ninety-seven lunatics and fifteen hundred and twenty-six idiots to the million. Making some allowance for possible mistakes in both of these cases, it would still indicate that there is not a general tendency to degeneration, mentally or physically. The condition of the palate which the doctor laid considerable stress upon, this enlargement or hyperostasis in the roof of the mouth, is a condition that I have

seen more often than any other deformity, probably because the patients that we see are not the kind that he has been examining. The people he refers to, and the casts of whose mouths we have been invited to examine, are not the kind that go to a dentist to have their teeth attended to, so we cannot compare them. We have very little opportunity really for studying these abnormalities, unless we go with him into the lunatic asylums, or among idiots, and study the subject from the stand point that he has done. It is with so much difficulty that we can study the question to any extent that we depend almost entirely for our knowledge of the subject upon gentlemen like the author of the paper. The better class of people are not, in my judgment, degenerating physically or mentally to any great or alarming extent, if at all.

Dr. Ottolengui.—I feel just a little foolish to-night, because I have brought with me a case full of models that seem to me to be rather out of place. I labored under a misconception of the subject. I understood that it was to be a discussion on cleft palate in its relation to degeneracy, and when I was asked by the chairman of the Executive Committee to bring some models with me, I agreed to do so. As long as I have them here, I will show them to you. They are from the collection of Dr. Kingsley.

There is one point that I would make now in connection with the models, and that is, whilst they are exceedingly abnormal mouths, they are casts from normal people. The patients are not degenerates in any sense of the word, so far as I know. They have not been convicted of crime, nor considered degenerate mentally. I would ask you to notice the marked similarity between many of the models, showing that even in abnormality there is a certain typical condition. Some of the models have instruments in them, which indicate the treatment which they have received, and one lot of casts represents children's mouths.

I would like to start by saying that I have recently been paying some little attention to criminal anthropology, and in that realm the most noted writer I think is Lombroso. I have made note of a few statistical figures which have a bearing upon our dental practice in connection with degenerates. Dr. Peirce has touched upon the subject of a return to the type of a degenerate ancestor. He asked whether that is the explanation of the abnormalities in connection with degenerates. Lombroso holds that it is, and that atavism explains everything. He shows that criminals who have a certain return to the physical ancestral type also have a definite moral turpitude. For example, a certain form

of jaw is peculiar to murderers, and the murderer who is a born criminal, who murders for gain and not in the heat of passion, must be more or less typical of a brute. The distinction between killing for personal advantage, for food, and for gain is a demarcation which has been made by civilization. If you find that in the large proportion of these murderers there is a given shape of the jaw or head, or various portions of the body, all of which are more or less a return to the ancestral form, that is a very good point in favor of the atavistic theory. He says, in speaking of these cases, that by an enormous lower jaw is meant a jaw which, when considered in proportion to the skull, is much larger than in the normal man. The prognathus jaw is found in seven per cent. of criminals, twelve per cent. of assassins, and thirteen per cent. of profligates. As to anomalous teeth: sixteen per cent. of criminals, twenty-eight per cent. of profligates, and eight per cent. of normals; so that those of us who make our living out of the normal have only eight per cent. to draw from. Madame Tarnousky, who has been a student of the subject, finds that in Russia there are anomalous teeth in forty per cent. of homicides, fifty-one per cent. of thieves, and seventy-eight per cent. of profligates. At first you might imagine that anomalous teeth are more common in Russia than elsewhere, but she finds anomalous teeth in only two per cent. of normals. The peculiar political condition of Russia is such that there is a very small intergrade between the law-abiding and the law-breaking. It is either for the Czar or against the Czar. They incarcerate people for very much smaller crimes there than anywhere else.

A word about what these anomalies of teeth are. One anomaly of the teeth (and this is peculiar among murderers) is the very large and prominent canine, with the other teeth dwarfed. If you look at some of the skulls in the Museum here, you will see at once that with prominent canines and prominent jaws you have a return to the ancestral condition very well defined. You have a retrogression to the anthropoid ape, and it is natural that we should find it in the class of people who have least regard for the laws of humanity. One of this type is a woman who had killed seventeen infants, and murdered over forty people altogether. She had nearly all these stigmata. While it was perhaps well to hang her, there was not the slightest excuse for killing her, from the standpoint of justice. It was purely selfish to put her out of the way, because she was a born criminal, and simply followed her natural bent.

Thirty per cent. of profligates in Italy have dwarfed lateral incisors,—atrophy of the lateral incisors. That seems very peculiar. In connection with cleft palate, the essayist said he had found more cleft palates among normal people than among idiots; but Lombroso says a cleft palate is most common among profligates. He placed the figures at one and one half in a thousand among normal individuals; that would make three persons in two thousand. He finds as many as nine in one thousand among criminals, and fifteen in one thousand among profligates. We should be very careful in accepting statistics. The addition of one or two more individuals alters the percentage. While Lombroso always speaks of *congenital* cleft palates, it seems to me that the cleft palate among profligate women may be due to syphilis, this class being peculiarly liable to it. I will relate the case of a woman in our practice, who came to us with a lesion of the palate, which was distinctly accidental, and we think syphilitic. The insertion of an instrument made it perfectly possible for her to keep her secret. Having known how to speak before, she is enabled to speak perfectly well with the instrument. To the world she is known as "Miss," but to us she is known as "Mrs. X," for she insists upon posing as a married woman, with the hope of deceiving us. I read Lombroso this summer, and immediately upon my return home there came to me a patient whose model I have here. I may say that this is the only cleft palate that I have had an opportunity to study with these ideas in my mind. I wish to call your attention to the fact that if the cleft of the palate is a sign of degeneracy, she ought to be very degenerate; but that girl is, from every standpoint of mental and moral worth, good enough to be adopted in any family.

Dr. Fruitnight.—I was very much interested in Dr. Peterson's paper. It is a very suggestive one. It seems to me the proper application consists in physicians observing these cases in childhood, and I shall certainly observe them more closely hereafter. In this way such degenerates might be put under the proper course as regards mental training, and I think that in this respect the paper is of considerable profit to us. I have no special experience or knowledge on the subject itself.

Dr. Peck.—I can make no valuable contribution to the paper, but am glad to speak of its scientific bearing, which commends it to every one of us. To me the subject was comparatively a new one, except in connection with nose and ear practice; but I was very much surprised, on looking up the subject, to find that cleft

palate did not exist in idiots, and yet the deformities that were so well explained by Dr. Peterson have been known for many years.

Dr. Down, of the Earlswood Asylum, England, as long ago as 1860, made some valuable contributions in regard to two hundred idiots, and they agree with what has been said to-night. I am sorry Dr. Peterson did not tell us more about the teeth in degenerates, and the narrow width between the teeth and gums in this class of patients. It would have been of great interest to the Society. The average width between the posterior bicuspid teeth of an inch and a half is much less in Down's collection of two hundred idiots, being as low as ten-twelfths of an inch. This was the case whether the patients were young or old, short or tall. A man six feet and one inch high and twenty two years of age presented the narrow space between the posterior bicuspid teeth of one and one-twelfth inches, and between the corresponding gum only five-twelfths of an inch at the widest interval. Age played a significant rôle in Down's table. Of the two hundred idiots under ten years of age there were eight persons; from ten to nineteen years, one hundred and twenty-three persons; from twenty to twenty-nine years, sixty-one persons; from thirty to thirty-nine years, eight persons.

In the quality and quantity of malformation eighty-two showed palates inordinately arched, of whom thirty-four had excessive concavities. There were also varying types of asymmetry in the concavities of the two sides. Seventeen per cent. showed a prominent ridge or keel antero-posteriorly; in seven the palate bones did not meet at all. In none was there a cleft palate; in fact, in six hundred idiots examined by Down, there was no instance of cleft palate.

With such anatomical facts the question arises, Is idiocy a cerebral lesion alone? Is it not due, also, to a want of local nutrition, as shown by the hard palate?

I want to claim the privilege, as a member of the Academy of Medicine, of praising the effort that this Society in particular makes in going outside of its ranks, or to a certain extent outside of its special feature, and bringing out papers of this character. It has been the aim of this Society for a number of years to interlard in its papers special ones which have a bearing on medicine, and it meets with the highest approval of medical men and those who have the interests of the sanitary public at heart. At the time of my membership in the Council of the Academy of Medicine, when I had the honor to represent the Library Committee, dentistry was looked upon as a specialty of the medical art, which is its proper sphere.

I learn that the same opinion now holds. I can only add that scientific work like that of to-night commends itself to every student in medicine.

Dr. Louise Fiske Bryson.—I cannot add anything to the discussion, but in examining a large number of children every year, I am struck with the number of dental anomalies. As Dr. Abbott says, the quality of the teeth here exhibited vary materially from the normal. The extremely narrow, highly-pointed palate is one often found associated with deformed teeth and erosions and a form of general malnutrition that points quite markedly to tubercular conditions. That is the only point that I believe has not been discussed.

Dr. Gouverneur M. Smith.—I must thank my friend Dr. J. Bond Littig for the invitation to be here this evening. I can warmly corroborate what has just been said by a Fellow of the New York Academy of Medicine in regard to the able manner in which the subject under consideration has been presented and discussed. I know that when the members of the medical profession of this city were building this edifice they wished it to be a grand centre of medical science. Your fraternity is engaged in a collateral calling to our own, and if all the scientific discussions which take place under this roof are conducted in the same careful and painstaking manner which has been shown here this evening, the Academy may well be proud.

Thanking you for calling upon me to take part in the discussion, I would say that I have nothing to offer from my experience which could add interest to what has been already said.

I could not help thinking, however, in connection with the subject of cleft palate, what an important work in one of our great hospitals in New York is now being munificently sustained by reason of an endowment in memory of a most estimable gentleman, a member of one of the old families of this city, who suffered with a congenital cleft palate.¹

As a boy he was most carefully educated in Europe and America. He graduated at Columbia College, and subsequently at the College of Physicians and Surgeons, later becoming house surgeon in the hospital. His articulation was very materially improved in his eighteenth year by reason of an operation by the late Dr. J. K. Rodgers. Successful as this was, his domestic tastes and studious habits led him to specially cultivate medical science proper, rather than to devote his life to the practice of his calling.

¹ Dr. Robert Ray, Jr.

Having become an adept in pathology, shortly after graduating from the hospital he was appointed curator of the hospital cabinet. He assiduously devoted himself to this work, preparing the first printed catalogue of specimens, following the classification of the Guy's Hospital Museum. But the institution was not long to have the benefit of his expert efficiency. In his twenty-eighth year he died from pulmonary tuberculosis.

I knew him in his mature years. He was an earnest student, an accomplished and Christian gentleman. His medical preceptor, the late Dr. John Watson, has appropriately embalmed his estimable character in a biographical sketch.

His devoted father, wishing to perpetuate the memory of his exemplary son, gave to the hospital several lots in this city, with the proviso that the rentals derived from them were to be expended in maintaining the Pathological Museum.

Dr. Thomas M. Markoe, Dr. William T. Bull, Dr. George L. Peabody, and myself constitute the medical committee having supervision of this department. Under the skilful and admirable management of the pathologist, Dr. Frank Ferguson, this large, valuable, and superb museum offers to medical students and medical men a vast field for study. It is an enduring memorial of a young man who died while in his prime, whose life had been tinged with sorrow by reason of an oral defect, and most worthily carries out the views of his honored father.

Dr. Quinlan.—My range of observation is very limited in this sphere. I have frequently seen, and know it to be a fact, that many grave diseases, not only of nervous origin, but also of the different organs that are allied to the upper air-tract, have been traced to improper breathing. We know the peculiar facial expression of idiots, the protruding tongue, the hanging of the lower jaw, owing to the depression of the buccinators. Those things have some cause. At birth, and probably in the state before birth, there are physical changes at work that alter certain tissues in the body. One of the most important functions of the body is breathing, and there are numerous follicles that do an immense amount of work. Certain changes take place, and instead of healthy absorption of material, we have a certain growth, and the breathing takes place through the mouth.

This may be a digression from the paper, but notice the effects of this mouth-breathing! I have often made a diagnosis of the location of these parts by inspecting the pharynx. How many children have been relieved! How many members of society

have been restored to their families! I remember the case of a little girl with the worst form of chorea I ever saw. She was isolated from her family on account of her feeble health. She was twelve years of age, and the doctor had tried to get her to some institution. I saw the peculiar expression of this class of people, the dry tongue and expression of the eye that characterizes mouth-breathing. I said I thought nothing could be done, and she should be taken to some institution where she could be cared for; but with a view of helping her to breathe better I suggested an operation, which entirely changed the nature of things and restored the child to her family.

A recent instance, mentioned by one of our magazines, is the case of a gentleman who for the past few years had been troubled with melancholia. If he had not had feelings of religion he would have done away with himself. Different operations were suggested by different physicians, and he had undergone a number of operations on almost every part of his body. It was found that one of his nostrils was filled with a polypus, the perpendicular plate of the ethmoid bone was necrosed, and his symptoms were such that the base of the brain was materially affected by the improper circulation of the blood. In a short time he was able to return to society.

Too much attention cannot be paid to this subject. My knowledge of degenerates is narrow, except that in going to some of the institutions for the feeble-minded I notice these peculiar characteristics. Time after time we have seen cases of children who are not able to breathe properly; the nurses will tell you they are irritable and restless, and a mild delirium seizes them. It affects the circulation of the brain, and has this effect on the individual. I thank you for the great privilege and honor of discussing this matter.

Dr. Peterson.—I have been very much interested in the discussion, and have read the paper here for the purpose of getting the views of the dentists. In regard to Dr. Abbott's remarks on dental anomalies, I have not paid very much attention to them, except as some of the many stigmata of degeneration. Some of them I am familiar with. As regards microdontism and macrodontism, I have seen a number of cases which were very marked. I know that the neglect of the teeth by most cases of idiocy must lead to a great many abnormalities, but whether any of these are congenital or not I do not know.

Dr. Peirce asked the question as to whether degeneracy was a return to an ancestral type. I do not think so. I think that idea must be abandoned. In the matter of idiocy, Dr. Langdon Down

many years ago propounded a classification of idiots according to certain racial types. He spoke of certain cases as being reversions to a lower type of human race. The Mongolian type of idiot resembled the Mongolian race of people, and so on.

In connection with the question of degeneracy, as to whether it is increasing or not, we must remember that besides the fact that has been already mentioned here,—that the degenerates become sterile after a while,—there is also the strong tendency of the hereditary impulse to be normal, that strong impulse of the whole race bearing on each individual to bring him back to a normal type. Those that pass the line and cannot be brought back become sterile in the course of time.

I was much interested in these cases of cleft palate, and I wish the subject could be thoroughly studied from the stand-point of degeneration. I have not been able to find anything in literature in regard to this matter. There are only two or three cases of cleft palate in the collection of four hundred and fifty cases of idiocy and imbecility on Randall's Island. I think it is a question that might be studied with much benefit. Dr. Ottolengui quoted Lombroso a good deal. I look upon him as an extremist in his ideas. He has done a great deal of good in criminal anthropology by calling attention to the degenerative stigmata, and has led others to follow him in investigating this subject; but he himself goes far beyond the facts. I have had the pleasure of meeting him personally and attending some of his criminal clinics, and believe he is too enthusiastic. He is inclined to be a sort of pseudo-anthropologist. His reference to projecting cheek-bones of criminals is rather amusing, because in Italy, where he resides, the projecting cheek-bone is rather rare; but in Scandinavia, where the projecting cheek-bone is common, he would probably change his views.

Dr. Quinlan spoke of mouth-breathing being the cause of a change in the hard palate. In people who are demented I think there is a tendency to mouth-breathing anyhow. In cases of imbecility and even idiocy, where there is not any change in the nasal cavities at all, and no particular change in the palate, you will find that mouth-breathing is a common symptom.

Dr. Abbott.—I would move that we pass a vote of thanks to Dr. Peterson for his able paper, and to the other gentlemen who have taken part in this discussion.

Motion carried unanimously.

JOHN I. HART,

Editor New York Odontological Society.

AMERICAN ACADEMY OF DENTAL SCIENCE.

THE regular meeting of the American Academy of Dental Science was held at Young's hotel, Boston, April 3, 1895, at six o'clock.

The paper for the evening was read by Dr. Charles A. Brackett, of Newport, R. I.; subject, "Assistants and Assistance."

(For Dr. Brackett's paper, see page 736.)

DISCUSSION.

Dr. Brackett.—Certainly all the ways of transacting the business of the world are undergoing modification. Not infrequently, when stopping in the city at the Thorndike, I have been assigned to a room which overlooked the doors that open into Park Square from the Providence Depot, and in observing the people coming in to their day's work on the early trains I have been very much impressed by noting what a large proportion of them are women, the majority of them apparently full of health and cheerfulness. It is impossible to go about in any of the business districts of this great city without noticing the fact that wherever there are books to be kept or letters written, women are doing a very considerable share of the work. I am a thorough believer in the dignified right of women to do all these things and many others. I am a thorough believer in the perfect propriety of their being graduates and independent practitioners, but there are many women of ability who perhaps would prefer not to assume the conduct of an independent enterprise, who may find in the assistant's place great opportunity to be useful to themselves and to others. I think there are some sound principles of social economy involved in this. I am sorry to say that I am only a very superficial student in political economy, or even in general economy. I must confess that I know very little about them, but it seems to me genuine economy in a man, when he has attained his skill in doing certain technical work, to employ labor to do that routine work in which less skill is required, or labor requiring another kind of skill. I have among my patients a man who has vast business interests, not of his own, but he has millions of property in his hands for his direction, and this property is particularly liable to injury from the elements: it is at risk at sea. He is a domestic man, and his wife sometimes asks him to do little things about the house. He does whatever he is asked, but occasionally, when he is fixing up new curtains or something of that sort, he will remind his wife that she is employing rather an expen-

sive man for that kind of work. That is the idea that in a sense applies to our work, and it seems to me the more we can cultivate this system, and not have it get beyond the demands of meeting the volume of business at hand, the more everybody is advantaged. There is as sound a principle for gain for the employer on a small scale as there is for the Fall River manufacturers who employ hundreds or perhaps thousands of operatives, or for the New York and New Haven Railroad Corporation in its great system, so that for the principal and employé it is a decidedly beneficent thing. Then when it comes to the service which is rendered to those who are the recipients of the service, they are greatly favored; they are acceptably favored. The day has gone by, I think, in most busy offices when the patient expects to see about the office no one but the single practitioner himself, and we should be surprised nowadays to have a patient say to us, "Now, this denture that I am to have you will do all with your own hands, won't you?" We do not hear that now as we did years ago. The patient recognizes the principle involved, that the directing mind need not necessarily have its own hands accomplish the work. I think the principles that I have tried to state, however poorly, are sound principles. I have endeavored to put this matter before you in a suggestive way. I speak not only to those of you who employ assistants, but I wish to put these matters before those of you who are struggling to meet the demands of a busy practice, who have arrived at that stage where the most unwelcome communication you receive is an application for an appointment, and the most dreaded sound is the ring of the door-bell, and to say to you that by the employment of assistance you may get rid legitimately and advantageously to all concerned of a share of the routine burden of work.

Dr. Eddy.—As you all know, I thoroughly believe in assistants, both lady assistants and professional graduates. There are many ways in which they can be of help to you. To begin with, there is a noticeable improvement in the neatness of the office, as every office shows at once the touch of a woman's hand in the ease and cleanliness in the arrangement of things about the room, and this neatness reacts upon the operator in the matter of dress. There is also a certain amount of refinement of manner in the woman, and that cannot fail to reach the operator and promote carefulness in his personal conduct and also in the expressions he uses before his patients. Again, the watchfulness and helpfulness of a lady at the chair begets self-confidence in herself, which, in turn, is fostered in

your patient, who develops confidence in the assistance, and they soon become perfectly willing to place themselves in the assistant's hands for whatever part of the work is intrusted to the assistant. I have my assistant meet all patients and attend to all formalities of receiving them and getting them ready for the chair; also, make appointments; also, when a patient comes for the first time, and the assistant takes a chart and makes a thorough examination of the patient's teeth, charts all cavities, and notes the doubtful ones, there is a great deal of time saved in knowing that you have seven cavities to deal with instead of seventeen. My oldest lady assistant treats all my dead teeth. After I remove the pulp she follows it up with whatever treatment I may suggest, fills the canals with gutta-percha, and the case comes back into my hands at a subsequent appointment with the main cavity ready to be filled.

I have found ladies more helpful as assistants than graduate dentists. After a graduate has been with you for a while his time is more and more engrossed with the patients which his own tact and ability have enabled him to acquire, as well as those you have placed into his hands. You do not feel like asking him to do those things that belong properly to a helper, and by the end of the first year they are of no assistance whatever. The lady does exactly what you tell her to do, and is more faithful in all her service: does not introduce a method of treatment you know is obsolete and from experience not satisfactory. One way in which they can save you considerable time is in making alloy or cement fillings. We have electric bells at all the chairs, and a hotel annunciator on the wall to tell which the call is from, there being five chairs, four operators, and one girl attends to two chairs. If we want filling material, a girl is called and told what is wanted, and by the time you are ready for it she has it all prepared. In preparing for crown-work there are cases where you would like to have some one mix your cement for you, and a lady assistant, with a little practice, can do this very satisfactorily.

What does all this help and avoidance of interruption mean? It means time saved that is valuable and that can be given to your patients. As the years go on, a man's reputation and practice should increase, and the only way he can obtain the requisite relief for exercise, social and mental stimulus, is by assistants. Again, it is a great precaution to have a lady assistant. In giving anesthetics to a lady a man with a small practice, in a city like Providence, is sometimes placed in an embarrassing position, and there are times when a lady assistant could be of great service to the operator.

As to the graduate assistant, a man at graduation is full of text-books, but not generally posted in professional readings. Seven out of eight of them are wholly without office experience. He enters an office of a busy practitioner. He exchanges text-books for years of experience. The old and new are brought together, and are both benefited. No man is wholly self-made. There are not all the elements in a man to wholly develop him; he has undeveloped faculties, or faculties apathetic. Co-operation develops faculties and activity, and a longing for the truth. The old man is pulled from the rut; the young man moves steadily, because he has a balance-wheel and a regulator to carry him over the dead centre, and take up and smooth out his erratic motion. Men do business alone and succeed, but the highest success comes by combination; evidence your great department stores and combination of bankers, etc.

Professional men, to-day need more correct business methods. Different men in an office look at the same subject from different points; it is the combination of the photographs of the same subject that makes the true picture.

The advantage of assistants from a pecuniary point of view Dr. Brackett has already suggested to us.

All these matters pertaining to the assistants and how best to make use of them bring added cares and responsibilities to the dentist, but who would not prefer in this busy, rushing nineteenth century to go out like the bursting of an incandescent lamp than to drown in his own oil like a tallow dip. We have only one life to live, and we all want to do our best with it. I don't see how it is possible for a man in a busy practice to do justice to himself and his patients without making use of assistants.

Dr. Clapp.—Dr. Brackett has told his story so gracefully that it is rather embarrassing to attempt to add anything to it. I will fully endorse every word that he has spoken, and just give one more duty that I place upon my lady assistant. This lady has been with me for twelve or thirteen years, and one of the things from which I receive very great comfort is in her attention to children and nervous patients. For instance, if I am at work on a child, she will read or tell the child stories that are suitable to its age, and these are the best anæsthetic, the best obtundent with which to handle children, as far as my experience goes. I thoroughly believe in it. Time and time again I have a child in my chair, and the lady devotes her attention to managing the child while I do the work and keep my mouth shut. Oftentimes for

ladies, young ladies, ladies of middle age, or elderly ladies, she reads chapters from books or short stories, and a two hour appointment passes almost before they know it. I would recommend to all of you who have lady assistants to try this method, for I am sure you will find that you will get very great comfort. I would like to emphasize one point Dr. Brackett has touched upon, and that is this: how anybody with a practice that takes his whole time and a little more can afford to be without an assistant at the chair is something that very much puzzles me. One can do from one quarter to one-half more work with the assistance of a lady than he can do alone. For instance, your patient is in the chair; every accessory to the operation is attended to by the assistant; you adjust the rubber dam, you prepare your cavity. Before it is quite completed you have determined with what you will fill that cavity. If it is amalgam, you tell your assistant that you want a medium, small, or large filling prepared of such an alloy. It is prepared and placed on the table before you, and when you lay down your excavator, after having made the last cut, without a second's delay you proceed to insert the filling. The same thing, of course, can be done with gutta-percha or cement as with the amalgam filling. The only objection to this method is that you wear your life out a little quicker; you won't live quite so long as if you stopped and took a little rest, instead of having things arranged so as to keep you working every minute of the day.

Dr. Andrews.—In a general way, Dr. Brackett's description of the lady in his office, and her duties, corresponds so nearly to the lady in my own office that I will simply say he has told you my own experience better than I could myself. My opinion coincides with that of Dr. Clapp and Dr. Brackett, that no busy dentist can afford to do without a lady assistant. I was very fortunate, perhaps, in securing one of the best,—I don't think it would be possible to have a better one. I would like to call on Dr. Cutter, who has had some experience with lady assistants.

Dr. Cutter.—I can add but little to what has already been said with reference to the helpfulness of lady assistants. The one that I have is invaluable to me. She makes all my regulating appliances and also relieves me of much care in adjusting them for my patients. I do not see how I could get along without her.

Dr. Ames.—You are all telling about the prizes which you have. I want to tell about mine. I have two lady assistants. I had a man in my laboratory for several years that I considered a very fine plate-worker. He was a young colored man who had worked at it

for a long time, and a couple of years ago he died very suddenly, and for a long time I could not find any one to fill his place. I finally decided that I would have to teach some one, so I took a young girl who was a niece of my cook. She was a young Irish girl, with a fair education, and was a nice, respectable young woman about twenty years old, and I commenced to teach her to make artificial teeth. She took hold readily and learned very quickly, and now she does all the work that is done in my laboratory to my satisfaction. My other assistant is very valuable to me, shows a great deal of tact in receiving patients, takes care of the office nicely, looks out for my instruments a great deal better than I could myself, and I think she is the best lady assistant I have ever seen. I never had a graduate assistant.

Dr. Eames.—It is difficult to add anything to such a complete paper on the duties of assistants, but, in a general way, I think, whoever has had such service, and attempts to get along without it, soon finds how much help the assistant was to him. It is almost impossible, after being accustomed to such assistance, to get along without it. I am indebted to Dr. Clapp for suggesting what he has told here to-night in the way of reading stories to children and to older people, and I have been following the suggestion for the last five years, with the greatest satisfaction. I have been fortunate in having my own sister as assistant, and I intrust to her the keeping of my books, the making out of my bills, and almost my entire correspondence. In the matter of filling the root-canals, I have not gone so far as to trust that to any one. It seems to me that it is an operation needing special skill and a knowledge of just what is best to be done. I would almost say that I would trust the filling of a cavity to an assistant sooner than the dressing of a canal, but I can see, very readily, how one could save a great deal of time if the assistant were competent to do it. In regard to the diagram and examinations of mouths, I have special hours in which I see patients for examination. I have small diagram-cards on which the result of the examination is noted, and at the time of the examination I try to estimate the time it will take to complete the work, and all remarks which I consider necessary to the case are put on this slip of paper and kept by the operating-case for reference until the work for the patient is completed. This, with the record of each visit and amount charged, is transferred to a larger diagram, on which fuller remarks are entered and all are subsequently posted into a book. In the matter of introducing gold to a cavity, I am sure that I lessen the time of operating one-half. The annealing of gold and

placing it in the cavity is done by the assistant. I simply nod my head when I wish it to be placed in the cavity and with the plugger point to the exact part where it is to be placed. The last touch of the instrument is understood by the assistant to be the spot where it is to be introduced. I would say that I find it of the greatest value to have duplicate instruments, and when I am through with certain excavators the assistant takes them away, and duplicate instruments, napkins, etc., are furnished, and the chair is in readiness almost instantly for the next patient.

Dr. Ainsworth.—I don't know that I can say anything in addition to what has been said. I have for a number of years made use of an assistant; not in all the ways that have been referred to to-night, but I can readily understand that the right person could render the assistance satisfactory in most of the cases spoken of. I should not know how to get along without an assistant, now that I have come to rely so much upon one.

Dr. Werner.—I think that must be the universal report of all those who have had assistants. From the first I have had my lady assistant assist at the chair, passing gold to the cavities. I talked not long ago with a dentist who has had an assistant for a long time, and he asked, "Did you say your assistant helps you at the chair?" I replied, "Why certainly, what would I have her for if not for assisting me at the chair?" He then wanted to know if some of the patients did not object to this, and I could record but one instance in which a patient objected, and that was mainly from a misapprehension of the duties of the assistant, and not being accustomed to having any one around besides the dentist. At the second sitting I asked the patient if she had any objections to the assistant helping me during the operation, and she replied, "Oh, no, I have got used to it now."

The first instruction I would give a new assistant would be in picking up things with the foil-carrier. I should at once set her to practising picking up small pieces of paper with the foil-carrier, and show her how to do it in such a way as not to obstruct her view or mine. That seems to be a simple thing for them to learn, and yet it is of great assistance to the operator. I find that they are very faithful and accurate in book-keeping. To my surprise the lady assistant I have now, after an experience of only three months, is making out and receipting all bills, and for months made but one trifling mistake.

Dr. Clapp.—I want to add just one word in connection with this subject of assistants, and that is, the advisability, I might say

necessity, of having large operating-rooms. I do not believe in having an operating-room that is not more than eight feet square, and confining three people in that room for the greater part of the day. In the interest of health it seems to me that an operating-room should not be less than fifteen feet square.

Dr. Werner.—You cannot always have that in an expensive locality of a city. There should be an electric fan in every dental office. They are a comfort, ventilating and purifying the atmosphere, preventing odors of anæsthetics or medicaments about the room or clothes of the operator; they are noiseless and inexpensive.

President Smith.—If no one else wishes to speak on this subject, I will ask Dr. Brackett if he cares to say anything in closing the discussion.

Dr. Brackett.—I will detain you but a few minutes. I wish to express this thought: The modern busy dentist, whatever his ambition and ability, and with all the help that he can advantageously employ, is still able to care for only a limited amount of dentistry. From this point of view one readily sees the necessity for economy in the expenditure of our time and energy.

I neglected to mention the practice of reading in the office, referred to by Dr. Clapp, and which I have followed somewhat for years with a great deal of comfort.

WILLIAM H. POTTER, D.M.D.,
Editor American Academy of Dental Science.

ACADEMY OF STOMATOLOGY.

Tuesday, October 15, 1895.

THE President, Dr. Guilford, called the meeting to order, and stated that this was a special meeting, called for the purpose of hearing a paper read which was written by Dr. Fillebrown, of Boston, and one also from Dr. Custer, of Ohio.

The president stated that Dr. Fillebrown was unable to be present, and also that some of the things which were to be used to illustrate the points in the paper had not arrived.

The paper was read by the secretary.

(For Dr. Fillebrown's paper, see page 731.)

DISCUSSION.

Dr. Darby, in explanation of Dr. Fillebrown's absence and of the apparatus which it was expected would be here, said,—

Just before I came to the meeting Dr. Kirk called at my house and stated that the apparatus had not reached here. It was forwarded by express, but up to the time of his leaving the dental depot, where it was to have been sent, it had not arrived, but I understood him to say there would be a large drawing of the apparatus here that you could see.

He also wished me to ask for some expression of opinion from the members of this society on this subject, believing that it was applicable to dental practice. Those of you who have been in the habit of administering either chloroform or ether—especially ether—to patients, and have taken advantage of the first stages of etherization in excavating sensitive teeth, know that it is of great value to the dentist in dealing with young and nervous persons.

Years ago, when I had more children to operate for than now, my son having taken most of that kind of practice, I frequently felt the necessity of etherizing my patients. Very frequently I would administer enough to give them courage and to make them less obstreperous. I found the greatest benefit to myself and freedom of pain to my patients by putting them under the first stages of etherization.

Now, if one can carry this along with this apparatus of Dr. Fillebrown's,—and I cannot see any reason why they are unable to throw a spray or vapor of ether into the patient's face eight, ten, or fifteen inches from your own, so that you will not anæsthetize yourself,—it seems to me it would be a great help in dealing with patients, either men or women. I know of a physician who will not submit to having a tooth filled that is at all sensitive until he etherizes himself, and he always demands a bottle of ether and an inhaler that he may take some when about to have a sensitive tooth excavated. That seems almost childish, and yet there are people who dread pain so much that they would rather etherize themselves, and even submit to the nausea which sometimes follows the full anæsthetic effect, than suffer the pain.

If we could keep our patients about half drunk on ether while excavating the teeth by this method, and by not anæsthetizing to absolute and dense drunkenness, I don't know but it would be a good thing to put into our practice.

I hope, for the benefit of Dr. Fillebrown and others, we may hear some remarks on the paper.

Dr. Thomas.—I agree with Dr. Fillebrown that for operations, such as excavating sensitive teeth, it would be an excellent thing. There is one objection to putting it in use in practice. Dr. Fillebrown acknowledges that it is impossible, or next to impossible, to get a patient thoroughly under the influence of ether with the spray or with the current, so that it is necessary to produce anæsthesia, first, by the usual method of placing a face-piece over the patient, and then keeping up the anæsthesia after it has been established. In that way I think it would be detrimental to one's practice in filling teeth and working around the mouth.

I can very readily see or understand that, when the condition of anæsthesia is produced to the point of unconsciousness, it could be very readily kept up, and it is an excellent method, in my mind, for doing so. It is not the ether vapor we want as much as it is the etherized air, and with an apparatus such as this, I do not see why anæsthesia could not be maintained almost indefinitely for operations in the mouth.

I hardly see where it is of any advantage to a dentist in the extraction of teeth, for the reason that it takes too long. If I had to keep a patient under it for twenty minutes to extract a tooth, I should want to follow another occupation. I have on frequent occasions, in giving nitrous oxide, first brought the patient to a state of anæsthesia, and then it has been kept up indefinitely by the administration of ether. It is a quicker and pleasanter way, by far, for operations extending over a length of time. By producing anæsthesia by nitrous oxide, it could be followed up by the etherized air which Dr. Fillebrown has introduced.

The danger of giving anesthetics is more from asphyxiation than from the effects of the anæsthetic. Anæsthesia, to my mind, is nothing more nor less than intoxication, whether by chloroform or ether, or anything else. The physiological condition is the same on the patient as is that effected by alcohol, one produced by inhalation and the other by alimentation. I don't see any more danger in giving ether than in a person getting drunk by liquor; the danger, except in idiosyncrasies, is from the want of oxidation. There are many cases that cannot bear this; they show symptoms of depression of the heart and symptoms of asphyxiation very rapidly. You have seen cases, probably, where a teaspoonful of brandy would intoxicate; others it would not so affect. There are those that anæsthesia would not affect as quickly. Take chloroform: I have known instances where even placing a piece of cotton saturated with chloroform in the tooth of the patient produced uncon-

sciousness. The specific effect caused by a particular anæsthetic, no matter what it is, to the same person, would be just as readily affected by the use of alcohol, so that sometimes dangers are produced more by asphyxiation than from the effects of the anæsthetic, whether vapor of ether, chloroform, or nitrous oxide. The element of danger is in the want of oxidation.

In Dr. Fillebrown's current the air is etherized, as he expresses it. I think, possibly, it would be better for him to have the current of air go through the ether rather than over it.

A man may be drunk on alcohol enough to be comfortable, or he may be drunk enough to paralyze himself. There is a difference between intoxication and paralysis. I remember on one occasion of giving gas to a patient in a case of laparotomy, and the young man, a physician, who was giving the ether, was much more interested in what was being done by the surgeon than in administering the ether, and I believe if I had not been there the patient would have died. The tongue had fallen back in the mouth and it came very near resulting fatally. If he had been watching the patient, as I do in giving nitrous oxide, and had taken away the plate or opened it to admit a little air as soon as there was any indication of asphyxiation, he could have carried the patient on indefinitely.

I should think the apparatus would be useful in long operations.

Dr. Cryer was called upon, but declined to enter into the discussion, as he had not heard the paper read.

Dr. Burchard.—I don't know anything, practically, about anæsthetics. I have seen, as Dr. Darby mentioned, in the early stage of intoxication, teeth extracted and minor surgery performed absolutely without pain and without any reaction at all.

But there is one point Dr. Thomas spoke of, and that is of anæsthesia being a purely functional disorder. It is more than that.

[The doctor then gave an explanation of the effects produced by etherization, the evidences of albuminuria, etc., stating that he considered the method of Dr. Fillebrown one of great usefulness as far as the primary stages of etherization are concerned.]

Dr. Porter asked of Dr. Thomas the question, How is it that, in administering nitrous oxide, we are more successful when we give the nitrous oxide without any admission of air?—that is, during its administration, not subsequently. Very often when any air gets into the system we are unsuccessful, when with a continued current of nitrous oxide we have almost perfect anæsthesia and are successful.

Dr. Thomas answered, In many cases asphyxiation can be

obliterated entirely by the admission of a certain amount of atmospheric air, the inhalation being not continuous, but alternate. I sometimes let go the nose or raise the lip to let a little air enter, and thus anaesthesia will be produced of a more profound character, and the patient will be under better control by the admission of air during inhalation than without it. If you exclude air entirely, you carry the patient to absolute unconsciousness. The convulsive action, the twitching and jerking, is entirely obviated by the admission of air to a certain extent. You can admit it according to the temperament of the patient, and it will relieve all that jactitation, jerking, twitching, and convulsion, and the patient will be carried into an absolute and profound state of anaesthesia much more satisfactorily than with nitrous oxide absolutely pure.

Dr. Porter then continued as follows: In regard to this question I think we have many perplexing problems. We all know the vivid dreams in the inhalation of nitrous oxide; we know the convulsion, we know the jactitation, and that is hyperaesthesia in one sense of the term; it is energy; it is motion; it is force. Here we have a force, a product of something poisonous, when force is generally a product of life, the product of activity.

When we look at the question in the light of modern science we find the difficulty vanishes altogether. The hyperaesthesia of nitrous oxide or ether inhalation is due to a current of energy circulating through the system and centring in one part. Now, that current is at the expense of the energy of the other parts. It is at the expense of the energy of the nerves of the tooth; it does not respond to any stimulus of any kind. There is no pain because there is no response, and it just lies in that word,—response.

We find it illustrated in many ways in physics: when we touch a violin string, it will respond to a touch, to the slightest stimulus; it stimulates the air and vibrates hundreds of yards away. We find it illustrated in many mechanical ways. Now, how is that response effected? It is effected because there is nothing in the earth or nature dead; we have activity in everything. In what we call dense matter or dead tissue, it is only dead apparently; there are energies, and these energies are opposing each other. That is the whole secret of the matter. In giving air with gas I have frequently had difficulty in extracting teeth, while the patient suffered considerable pain; in one or two cases I have neglected to hold the nose and have had considerable difficulty. The reason is simply this: in the continued response of the cells of the brain there is that combination of energies together; there is that response.

At this point Dr. Burchard stated that he did not think the remarks made by Dr. Porter were entirely pertinent, and he thought Dr. Porter was confusing terms.

After some conversational discussion between Dr. Porter and Dr. Burchard, the president stated that while the matter could be very profitably discussed at another time, it was not in the line of the paper read, and it would be well to confine the discussion to the paper.

Dr. Pearsol, of Dublin, was next called upon by the president, and made the following remarks:

It does me great honor to be called upon to say a few words on this matter, because anæsthetics have exercised our minds over on the other side of the water as they have yours on this side.

There are two schools of anæsthesia at home. One contends that chloroform is the only road to salvation, and the other that ether is the direct course; but there is a mean between the two. It is not uncommon to find that a person with a large experience in the use of chloroform is involved in difficulty in administering ether, and one familiar with the use of ether fails to administer chloroform. A man who gives ether properly ought to have the patient ready in about three minutes; sometimes I have seen it done in a minute and a half; it may go on for five minutes, but I think the time mentioned by Dr. Fillebrown is all wrong.

We use it in the dental hospital in Dublin a great deal for the extraction of teeth; more than nitrous oxide, and the reason is simply that it is so much cheaper to anæsthetize with ether than with nitrous oxide; nitrous oxide costs about two shillings a head, whereas ether is fourpence, and as we are all poor people, we have to take the ether. In operating we issue directions to patients, so that we do not have the same trouble as formerly. A patient purchases an anæsthetic card beforehand, and makes an appointment for a certain time in the morning, and they are recommended to come fasting, because it is a well-known fact that this is a great advantage in administering anæsthetics. I have seen the most distressing scenes with patients who, if they had had the stomach empty, would have had no trouble at all.

In Dublin we are very fortunate in many ways, because we have some excellent administrators of anæsthetics among the medical and surgical professions, and we have very few deaths in the year. We have not had more than one death in five or six years past, while in London, on the contrary, where chloroform is much more used than ether, they are having an epidemic of deaths. If you read

the *Lancet*, you will observe how many deaths have occurred on the operating-table. I cannot tell the reason.

Dr. Hewitt, of London, has certainly made a great advance with the method which he uses. In the cases in which I saw him operate there was no crying out nor shedding of tears, such as we often see. I think Dr. Hewitt has recently made his apparatus very portable; simply a bottle of oxygen and a bottle of nitrous oxide, with a little foot-piece with which you can turn it off and on, and a chamber for mixing it in. It used to be very cumbrous, but he now has it in convenient form.

I can say no more except that I am glad to see you are traveling in the same direction as we do at home. My experience teaches me that if a man will give ether with the chloroform method, he will have trouble; but if we have a chloroform man to give chloroform to the young and an ether man to give ether to adults, we can save a great deal of trouble and time.

I do not usually attempt anæsthetic work in my office, but generally in a patient's room, because then if the patient is sick at all it is in his house and not in my room, and I think it is under more favorable conditions.

Dr. Custer followed with his paper on electrical heating, accompanied by experiments. These were interesting and effective, but were not of a character to elicit discussion. A few questions were asked by the members, which were answered by the essayist.

Dr. McQuillen stated that the members of the society were invited to attend the November meeting of the Odontological Society of New York City, and that Dr. George D. B. Darby would read a paper at that time.

Dr. Truman.—Before we adjourn I desire to express my appreciation of the exhibit of Dr. Custer we have seen here to-night, in which I have been very much interested, and feel it due to the exhibitor to express my thanks.

As I sat here and recalled my early boyhood days, when I used to sit in the cellar by the furnace for the purpose of manufacturing porcelain teeth, with all the difficulties of heating, and then to be translated from that time to this table with the same process going on within a flask of a few inches in diameter, it seems to me all an indication of the great progress that has been made, not only in dentistry but in everything, in science and art. Therefore I feel it a gratification to express my appreciation, and I move that a vote of thanks be tendered Dr. Custer, by this society, for the careful work of this evening.

Dr. Peirsol also expressed the great satisfaction with which he had witnessed the experiments, and hoped there would be some way to have these exhibited in England before the dental societies.

Dr. Burchard seconded the motion of Dr. Truman and spoke of the great advance that had been made as illustrated by the experiments of the evening.

On motion, adjourned.

GEORGE D. B. DARBY,
Secretary.

Editorial.

SPURIOUS HISTORY.

THE readers of journals must have been impressed with the fact that very little attention is ordinarily paid to historical verification of statements made. So serious has this careless handling of subjects become that it is as much of an evil as the plagiarism which we have had occasion to allude to in a former number, and which has been a blot upon the literary work of the profession for years.

Writers seem to forget that a statement involving an historical fact should never be made until all possible means of verifying its accuracy have been exhausted. The responsibility is a very great one. The difficulties surrounding this effort are many and not easily overcome, for it means a research into the very origin of things pertaining to dentistry, and a thorough acquaintance with its literature and that of collateral subjects not possessed by the many, and, probably, in its entirety not by any one.

It not infrequently happens that writers will quote the last article read as authority without the slightest effort to discover its truthfulness, when, if the facts were known, it would be made clear that the supposed original writer had thoughtlessly or criminally assumed that his statement ought to have been correct, and affirmed it accordingly. The next writer, feeling the obligation to quote, refers to this or copies without credit, and thus the false statement goes ringing down the years until a later generation accepts it as a fact.

One of the most notable examples of this in recent years has been seen in the various papers and discussions upon pyorrhœa

alveolaris. The attempts made to give correct history on this subject would be amusing were it not so serious. It would be difficult to give the countless blunders made in the history of this subject, errors which it will require years to rectify. We have tried many times to enforce the truth of history in regard to this, that we are indebted to the older, as well as the modern, French writers for the first and most thorough descriptions of this pathological condition. It was with more than ordinary satisfaction that we welcomed in our last number Dr. C. N. Peirce's timely work in his historical *résumé* of the labor performed by the French dentists upon this subject, and it is to be hoped that this paper will settle for all time the historical side of the question, and relegate the former crudities of statement to oblivion.

This, however, is only typical of a whole series of errors ranging from the absolutely false to the supposed discovery of *new things* and *new methods* already hoary with age.

Perhaps one of the worst features of this mutilation of history is the attempt, frequently made, to belittle the work of the past. If some writers could be believed, there was no such thing as a good filling made fifty years ago; that the practitioners of that period had no knowledge of mechanical dentistry or methods of treatment; in fact, in the light of present superior knowledge, are not worthy the slightest recognition. Indeed, if these writers are to be believed, the work of the fathers was but a crude basis for the more perfect superstructure of which they form a part in the present. The men of the middle half of the nineteenth century are fast passing away, and soon there will be none left to bear personal witness to the truth of the assertion, which we unhesitatingly make, that the mechanical and operative work was, at that period, as effective as at the present; and the mechanical work of the past decade can claim no superiority over that of fifty years ago; indeed, it is doubtful whether it can compare with it in character and durability. It is to be questioned whether any of the younger generation of workers have ever seen such exquisite pieces of plate work as were turned out by Reynolds, originally of Geneva, N. Y. Such a thing as his double-backed gold plates are unknown, as far as we are aware, at the present time.

It was, therefore, with something of a shock that we read in the September number of the *Dental Review* the following paragraph, part of the discussion upon a question on "Operative Dentistry":

"There is no gentleman present this evening who has entered into anything like a retrospect of the injury that was done to the

manipulative ability of the dentist during the period from 1850 to 1880 by the introduction of vulcanite and the introduction of nitrous oxide gas for the extraction of teeth. I began the study of dentistry in 1867, and my preceptors began the study of it in 1855, and neither of them could make a gold plate, because they had not been taught to do it. There was scarcely any instruction in any of the dental colleges between 1851 and 1852 and 1865 with reference to the manufacture and fabrication of metal plates, and the demonstrator himself, as a rule, was not capable of doing it. Consequently, the whole body of the dental profession nearly were unable to do metal plate work. The ease with which teeth were extracted through the administration of nitrous oxide, and the ease with which artificial teeth were inserted, decreased the value of the services of dentists all over the country. If you went into little towns at that time you would rarely find a man who could put in gold fillings. He did not dare to do it, because cement fillings were being inserted for fifty cents a piece."—HARLAN (*italics ours*).

It seems incredible that any one should have made such statements, and particularly one occupying the position of the speaker. We should have been inclined to believe that it was a reportorial error had the paragraph not had editorial supervision.

We would beg leave to call the speaker's attention to the fact that up to 1850, and for some time thereafter, nothing but gold and silver were used as bases for artificial teeth in this country. Ivory and bone were used in Europe, as well as the metals. The "moulded" or poured tin base was made by Hudson, of Philadelphia, about 1820; but it was not used, to any extent, until Dr. George E. Hawes, in 1850, revived the process, and even then it was not generally adopted. It is in the last degree absurd to suppose that men who had nothing else to depend upon but gold and silver should not have become skilled in its use. It will be news to those now living who practised in the period alluded to, to be told that "the ease with which artificial teeth were inserted decreased the value" of their services; and it is still more singular that the extraction should have been accomplished "through the administration of nitrous oxide," inasmuch as this agent was not brought into general dental practice, as an anæsthetic, until introduced by G. Q. Colton in 1863, although originally applied by Wells in 1844.

It was not until 1855 that a patent was taken out in England, by Goodyear, for making a dental plate of hard rubber, and in this country by Cummings in 1855; but its use was by no means general, even as late as 1860. The first denture inserted by the writer

was in 1858. The influence of vulcanite was, therefore, not marked in the decade between 1850 and 1860.

It is sad to think of what little value the teachings of Maynard, Harris, Townsend, Arthur, Westcott, Dwinelle, Rich, and a host of others could have been, that you could "rarely find" in the "little towns a man who could put in gold fillings." It was in one of the little towns in 1848 that the writer met a man who could place in gold equal to a Varney or a Webb. The reason given that the dentist "did not dare to do it because cement fillings were being inserted for fifty cents," seems rather out of place, in view of the fact that the first cement introduced, of any value, was the oxy-chloride of zinc, the invention of M. Sorel, in 1856, for stucco work, but did not come into dental use for several years thereafter.

The dentist of these earlier decades was forced to make his work with a reasonable degree of thoroughness, and all dentists worthy the name were instructed in the manipulations in private offices and in colleges. To say that nothing of this kind was taught in the latter is a libel on these institutions. That this may not have been done with the care with which it is attempted to-day is possible, for the very excellent reason that students were all, with few exceptions, familiar with the work before entering the schools, and not, as now, taken without previous preparation.

We do not know the college from whence the preceptors of the speaker received their diplomas. They certainly were not of the kind familiar to the writer, if the demonstrators were unable to make a metal plate. Such a serious lack of knowledge would have ended in an early dismissal from the service.

The object of this article is not to criticise the historical failings of individuals, but rather to use these as an example to impress the fact generally that accuracy of statement was never more needed in speaking and writing than to-day in dentistry. It must be remembered that this profession is yet in its youth, and it is vitally important that the details of experience be correctly gathered as we advance to a broader and more exact knowledge.

THE CLOSE OF VOLUME XVI.

THE close of the year's work on a journal such as this necessarily leads to reflection. The labor of preparing a volume of eight hundred pages is not a trifling matter, and is in itself worthy of

notice, but the important consideration for the editor is that, in overlooking the work of the past, he can dwell with peculiar satisfaction upon the energy in societies and activity in individuals manifested in its well-filled pages. It is with some degree of pride, therefore, that we can consistently feel that this journal has in the past year maintained its well-earned character, and for this we specially desire to thank our contributors, who have so unswervingly aided in the support of a journal devoted to the highest interests of the profession of dentistry.

The support given it by the large list of subscribers, now extended and constantly increasing over all civilized lands, is a silent but most effective testimony to the value of the journal as a medium for professional thought, and we naturally feel gratified at the result.

The year, now nearly closed, has been one that followed several of great business depression, but the past year has largely and happily changed this, and the JOURNAL, in common with other enterprises, has been benefited thereby.

It is hoped that the dental profession will bear in mind that the only way to raise to a higher standard is to work persistently for it, and this can always best be done through that medium that will educate the largest number. For this purpose no agency is so effective as the well-conducted journal. It is desired that those who have been the gainers by the labor devoted to the production of this periodical will endeavor to increase its influence by individual effort.

The lapse of a year is too short a time to note marked changes, yet it must seem to the reflecting mind that there have been influences at work during the past twelve months that must result in a healthful growth in the future. Among these can be noted the tendency towards a more scientific trend of thought, with a corresponding lessening of that crude and superficial self-assertion so prevalent. For these beginnings of a more fruitful era the profession of dentistry is to be congratulated. These are the guideposts that unerringly point to a future where essays will be founded on exact knowledge and not on mere speculation.

With the promises of the past we enter with confidence into another year, feeling that the work completed is bearing rich fruit, and that this will continue to be the result as long as men are true to their highest aspirations.

GOLDEN ANNIVERSARY CELEBRATION.

THE attention of the Dental Profession in Philadelphia is called to the notice under this head in "Current News."

The past fifty years has witnessed greater changes for the advancement of dentistry than any previous period, and it therefore seems proper that it should be celebrated by the joint efforts of the dental societies in that city. It is anticipated that the occasion will be one of interesting reminiscences of an epoch replete with activity.

Bibliography.

METHODEN UND NEUERUNGEN AUF DEM GEBIETE DER ZAHNHEILKUNDE. Von Wilh. Herbst, Zahnarzt in Bremen. Verlag: Odontologische Verlagsanstalt. Berlin.

This work of Dr. Herbst is the result of twenty-five years of practice, as stated in his preface, and covers the public descriptions given of his original methods in this and other countries. Those who recall the author during his visit to the United States will renew the interest then felt in this more detailed account of his ingenious appliances.

Whatever may have been thought of his rotation method of filling teeth, whether for or against, great credit was due him for his untiring efforts to explain, as far as one unacquainted with English could explain, the value of this original idea. The impression he left upon American dentistry was of great value, as his work demonstrated to astonished audiences what could be done by an inventive and energetic mind outside of schools and largely isolated from the active dental world. Since then this same creative force has evolved many original ideas. These he has given in this book of 295 pages, extensively illustrated.

The first part very naturally begins with the work that made his name famous,—“Gold Filling after Herbst’s Method of Rotation.” This chapter covers the whole process, with full illustration of his various matrices. Most of these are familiar to those who saw him work.

His method of preparing glass inlays is described, followed in the second part by crown- and bridge-work treated in detail.

The third part is largely made up of novelties in practical work. The last chapter is devoted to the manufacture of gold for dental purposes.

This book has a value peculiarly its own, and while it is doubtful whether, if translated, it would add materially to our practical knowledge on operative or mechanical work, it would still be gratifying to many English readers to have Dr. Herbst's methods in permanent form and of easy reference.

Current News.

REPORT OF TREASURER OF WORLD'S COLUMBIAN DENTAL CONGRESS IN FULL FROM MARCH 23, 1891, TO JULY 23, 1895.

RECEIPTS.

American Dental Association	\$1,000 00
Illinois State Dental Society	321 00
Iowa State Dental Society	100 00
Southern Dental Association	200 00
Washington City Dental Society	50 00
Alabama	130 00
Arizona	20 00
Arkansas	20 00
Austria	10 00
California	548 00
Canada	20 00
Chili	10 00
China	30 00
Colorado	40 00
Connecticut	220 00
Cuba	10 00
Delaware	50 00
District of Columbia	130 00
England	50 00
Florida	20 00
France	100 00
Georgia	125 00
Germany	10 00
Hawaii Islands	40 00
Illinois	3,802 00
Indiana	355 00
Iowa	430 00

Italy	10 00
Kansas	130 00
Kentucky	120 00
Louisiana	60 00
Maine	190 00
Maryland	250 00
Massachusetts	395 35
Mexico	20 00
Michigan	245 00
Minnesota	405 00
Miscellaneous	11 70
Mississippi	40 00
Missouri	715 00
Montana	10 00
Nebraska	180 00
New Hampshire	10 00
New Jersey	477 50
New South Wales	30 00
New York	1 515 30
North Carolina	210 25
North Dakota	40 00
Ohio	620 00
Oregon	20 00
Paraguay	20 00
Pennsylvania	840 30
Rhode Island	25 00
Russia	30 00
Scotland	20 15
South America	10 00
South Carolina	130 00
South Dakota	10 00
Spain	20 00
Switzerland	20 00
Tennessee	290 00
Texas	170 00
Vermont	120 00
Virginia	100 00
Washington	80 00
West Virginia	10 00
Wisconsin	150 00
American College of Dental Surgery	10 00
Baltimore College	10 00
Chicago College	10 00
Columbia University	10 00
Louisville Dental College	20 00
New York Dental College	10 00
Ohio Dental College	10 00
Philadelphia College	10 00
University of Buffalo	10 00

University of California	10 00
University of Minnesota	10 00
University of Western Reserve	10 00
Wilmington Dental Manufacturing Company	40 00
	<hr/>
	\$15,851 55
Amount received from Columbia National Bank	286 06
Donations of Executive Committee	3,600 00
	<hr/>
	\$19,737 61

DISBURSEMENTS.

General Finance Committee, L. D. Shepard	\$926 25
Executive Committee, Secretary's Expenses	3,018 84
Treasurer's Expenses	583 59
Treasurer's Bond	100 00
Secretary's General Expenses	1,299 48
State Conference Committee, J. Taft	218 87
Registration Committee, Fred. A. Levy (per G. C. Brown)	34 00
Invitation Committee, W. C. Barrett	16 95
Clinics Committee, C. F. W. Bolecker and S. H. Guilford	80 35
Biology Committee, R. R. Andrews	18 15
Nomenclature Committee, G. V. Black	31 00
History Committee, J. Taft	1,523 57
Membership Committee, E. Noyes	13 50
Publication of Transactions Committee, A. W. Harlan	4,529 95
Donations by Executive Committee, Travelling Expenses	3,600 00
Woman's Department	307 00
Dental Manufacturing Company, S. S. White	121 80
Medals	720 00
Buttons and Badges	257 63
Club House	1,530 00
Banquet, Deficit	274 60
Refunded Memberships	50 00
Exchange	6 36
	<hr/>
	\$19,261 89
Paid by Columbia National Bank	286 06
Unpaid by Columbia National Bank	127 09
	<hr/>
	\$19,675 04
Balance, July 23, 1895, in Merchants' Loan and Trust Company Bank	62 57
	<hr/>
	\$19,737 61

(Signed) JOHN S. MARSHALL.

Treasurer.

MASSACHUSETTS DENTAL SOCIETY.

THE following officers have been elected for the ensuing year: President, Geo. A. Maxfield, D.D.S., Holyoke; First Vice-President, Waldo E. Boardman, D.M.D., Boston; Second Vice-President, Harry S. Draper, D.D.S., Boston; Secretary, Edgar O. Kinsman, D.D.S., Cambridge; Treasurer, Edward Page, M.D., D.M.D., Charlestown District; Librarian, Thomas W. Clements, D.D.S., Brookline; Editor, Joseph T. Paul, D.M.D., Boston.

The State and Society have been divided into districts, with officers governing the same, as follows: North and South Metropolitan, North and South Eastern, Central, Valley and District Dental Societies, Western.

EDGAR O. KINSMAN, M.D.S.,
Secretary.

GOLDEN ANNIVERSARY CELEBRATION.

PHILADELPHIA, November, 1895.

DEAR DOCTOR,—Fifty years ago the first effort was made to organize the dentists in Philadelphia by forming a society having for its object the advancement of dental education.

You are cordially invited to attend a meeting and banquet to celebrate the golden anniversary of that event, to be held at the Continental Hotel, Ninth and Chestnut Streets, on Monday, December 16, 1895, at 7.00 P.M. Banquet at 7.30 P.M.

Kindly inform us by December 10 if we may expect the pleasure of your company.

Seats for the banquet will be \$4.00 per plate, which amount please send to Dr. J. D. Thomas, 912 Walnut Street, Philadelphia, by December 13, in order that a place may be reserved for you.

COMMITTEE.

Pennsylvania Association of Dental Surgeons.—Dr. Wm. H. True-
man, Dr. T. F. Chupein, Dr. Howard E. Roberts.

Odontological Society.—Dr. L. Ashley Faught, Dr. Alonzo Boice,
Dr. I. N. Broomell.

Academy of Stomatology.—Dr. James Truman, Dr. R. Huey,
Dr. Henry Register.

Special Committee on Invitations.—Dr. L. Ashley Faught, Dr.
Howard E. Roberts, Dr. J. D. Thomas, *Chairman*, 912 Walnut
Street.

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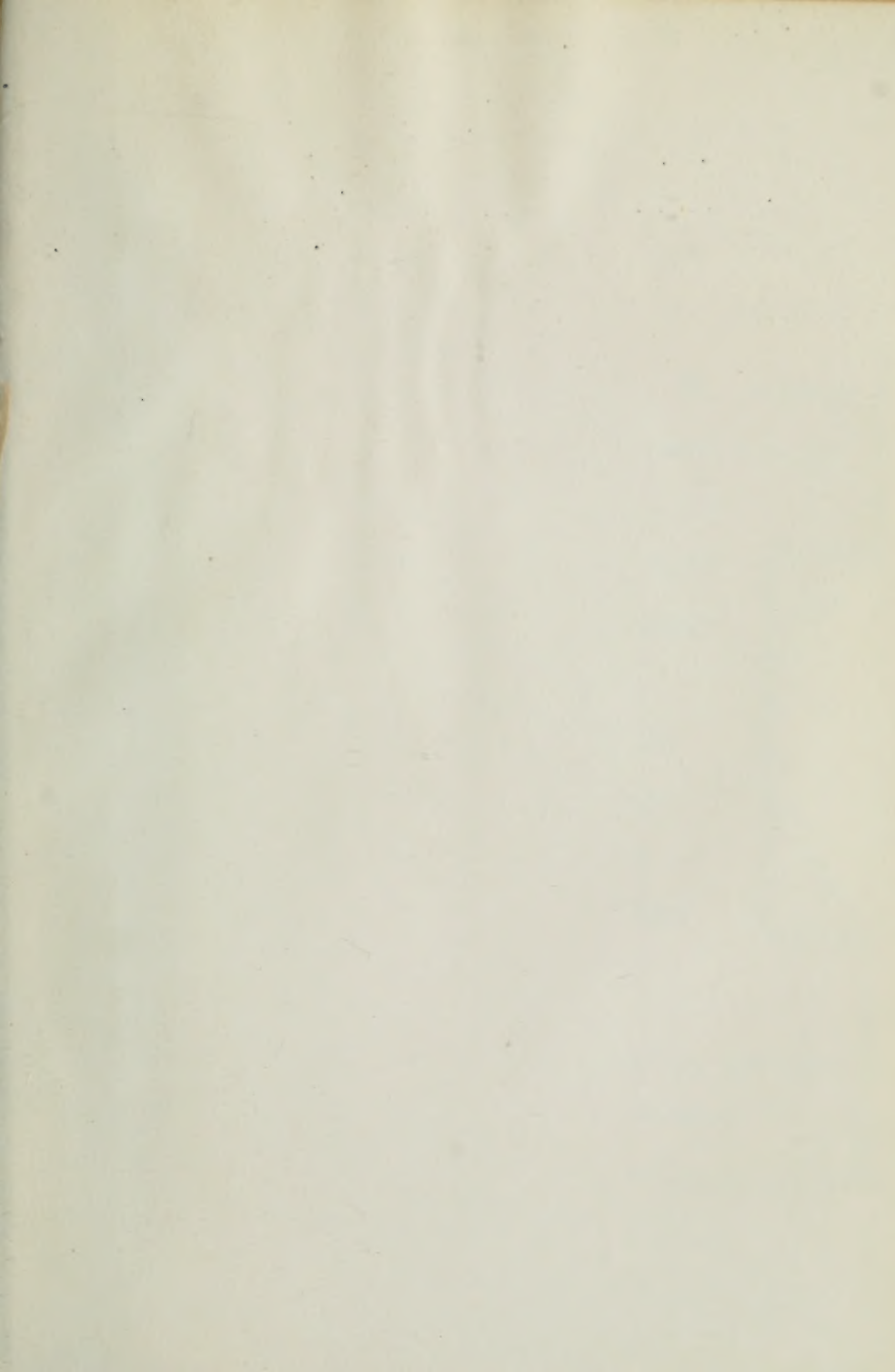
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